

THE SOUTHERN PLANTER

DEVOTED TO

AGRICULTURE, HORTICULTURE, LIVE STOCK AND THE HOUSEHOLD.

T. W. ORMOND,	-	-	-	-	-	PROPRIETOR.
W. C. KNIGHT,	-	-	-	-	-	EDITOR.
W. C. JACKSON,	-	-	-	-	-	ADVERTISING AGENT.

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DEVOTED TO

Agriculture, Horticulture, Live Stock and the Household.

Agriculture is the nursing mother of the Arts.—XENOPHON.

Tillage and pasturage are the two breasts of the State.—SULLY.

T. W. ORMOND,	-	-	-	-	-	-	-	PROPRIETOR.
W. C. KNIGHT,	-	-	-	-	-	-	-	EDITOR.

43RD YEAR.	RICHMOND, DECEMBER, 1882.	No. 17.
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FARMERS AND FARMING IN VIRGINIA IN THE OLDEN TIME.

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No. 5.

[The following letters, printed from the original MSS. in our possession, will be interesting as showing the feeling in respect to agriculture in the early years of the present century, and their authors and those to whom they are addressed, being all leading men of the State who have long since passed from life, their publication now may awaken interesting reminiscences in many households of Virginia.

First, The letter from Judge Paul Carrington, of Charlotte county, to his son-in-law, Col. Wm. Cabell, Jr., of Amherst county, dated 19th March, 1782.

Second. Letter from Dr. J. W. Galt to Gen. J. H. Cocke, dated 9th December, 1803.

Third. Letter from Jos. Scofield, of Lancaster, England, to Joseph C. Cabell, of Virginia, then in London, dated 6th of September, 1804. This letter shows that Mr. Cabell was the first to introduce into Virginia, and perhaps the United States, the circular saw.

Fourth. Letter from Col. Jno. Taylor, of Caroline, to Dr. George Washington Tennent, of same county, dated 24th of June, 1805, on the Yeatman, or cow, pea.

Fifth. Fragment of letter, under date of August, 1807, from Francis Watkins, Sr., then clerk of Prince Edward county, and owner of the upper half of *Elk Island*, to Nicholas Cabell, Jr.]

Dear Sir,—I have your letter of the 18th. It is equally convenient to me to send your cattle now as at any other time. The season is not so proper, as cattle at this time of year are generally too weak to drive far; however I have sent such as I think will go very well, if driven slow and fed well on the way. They are chiefly young cattle, and in a few years will be *very*

sine. Gen. Green last winter, and other troops since, so wounded my elder stock that I have none to spare but such as I've sent. *They are a fine breed of cattle, and if well taken care of will be very good and large.*

I have wrote the state of the family, to which I refer you. I am so unwell I can scarce set up to write this short letter. My best respects to my old friend and esteemed acquaintance, Col. Cabell; tell him I would write him, but cannot, at present, without great inconvenience, though I am getting better. You'll see by letter to N—— when I shall be at home.

Your affectionate friend,

19th March, 1782.

P. CARRINGTON.

Dear Sir,—When I was at your house you mentioned your intention of cultivating the *Pride of China* for *feeding sheep*—this will answer for the winter months very well—it did not occur to me then to recommend to your notice the cultivation of *Scotch Broom*, which affords an ample food for between two and three summer months for sheep and hogs. It affords an abundance of flowers, which those animals devour greedily; it fattens them fast, and comes early, and will last till the wild fruits are ripe—such as mulberries, blackberries, and hurtleberries; after that the chin-kapin succeeds; this, added to the others, will give you a succession of food for ten months in the year.

I have sent you seed sufficient to plant all your hill-sides that you do not mean to cultivate in grain. Its roots are fibrous, of course they will prevent the land from washing. They should be put in directly—planted at five feet distance—four or five seed in each hill and about one inch deep, to prevent their being affected by the rays of the sun. They will lay in the ground for two winters, and sometimes three or four, before they vegetate. When I left England I brought some of the seed that had been gathered for twenty odd years. I planted them as an ornamental flowering shrub in the garden. They remained in the ground four winters, then vegetated finely, and grew very luxuriant. The seed now sent I saved the summer before last from Mr. Lucas's land in Warwick. It was originally planted as a hedge by an old Englishman, from which it has spread over some hundred acres of land by the birds. In England they have a method of expediting the vegetation of broom, hawthorn and holly, by mixing the seeds with the feed of their horned cattle and keeping the cattle up till they have passed the seed. They then sprinkle this over their land and plow it in in the fall

season—in the spring the seed will vegetate. As this process would be too late for this winter, I would recommend the mode I first proposed. They require no care after being sown. My best respects await the whole family. I am, dear sir,

Yours very respectfully,

December 9, 1803.

J. W. GALT.

Sir,—Urgency of business calling me from home has prevented me writing you respecting the saws agreeable to my promise. The present is principally to inform you that I again saw Mr. Adkins on Monday last, when he repeated his assurance that *the Circular Saw* which he shewed you is a *new* contrivance, and only used (and he believes manufactured) by one person in Sheffield. On this account he recommends you to have the draught as originally proposed, which he will order to be done, and the price not to exceed 10s. 6d. This sum might be left with Mr. Rennolds, and I will take advantage of the first opportunity to forward it, carriage free, for your address, to Mr. Rennold's care. If on your arrival in America you should wish to introduce these saws, we will with pleasure procure them for you.

The little purchase you made at Cartlet's is now on its way to London, and you will find inclosed two plain razors, which I beg you to accept. If you are at any time disposed to make trial, for the sake of conveniency, of *cold* shaving, permit me to repeat the below directions, which I have found practicable from experience, and though recently much averse to this method, I now give it a decided preference. Wishing you a most prosperous voyage, I remain, sir, Your most obedient servant,

Lancaster, Sept. 6, 1804.

JOS. SCHOFIELD.

Make choice of soft water, in which dip the square of soap, and then rub it on the face; apply your shaving-brush till a good lather is produced, and of course you will find the friction of the brush upon the beard to greatly soften it. For my own use I prefer "Middleton's Abyssinian Soap," which is sold by most perfumers. I believe I mentioned the necessity of wiping the razor quite dry, on a soft piece of linen, each time of using, and previous to the operation to draw it gently and as flat as possible, once or twice over the strap; a *flat* strap, too, is preferred.

Dear Sir,—The Yeatman pea for your friend is sent with pleasure. It is, however, too late to plant it, except for the purpose of sowing the pods first ripening for seed, and even for this end it ought to be placed in a quick soil.

The most beneficial modes in which I have used it, are to plant it among corn in strong land, and feed it off with sheep, and to drill it in rows three feet asunder and cut it for horses. The sheep may be turned on after the peas begin to ripen considerably, and they will become fine mutton without injuring the corn in any considerable degree. The peas to be cut for horses ought to be sown early in land well manured, and kept clean until they have nearly covered the ground. They will produce a crop of green food surpassing clover or any other vegetable I ever saw. When the pods begin to appear, the vines are cut at the root, or drawn up root and all, and given to horses in lieu of cut clover. There is no food they eat more heartily, or on which they fatten more rapidly, and it comes in the fall after clover fails or is unhealthy, placing the horse in a very healthy state to go through the winter. Taken off vine and all, it is, like other crops thus removed, an impoverisher; but leaves the land so very clean, that wheat and clover prosper after it.

But I conjecture that the annual cultivation of the same inclosure in this pea (adapting the quantity of land to the number of hogs), for the purpose of feeding off the pea in fattening pork, would be more beneficial than either of the modes I have tried. The destruction of a portion of the vine, and the manure of the hogs, would probably improve the land. They should be turned in on the first frost. This experiment I have only requested, because I do not raise hogs here.

Such are my hasty reflections upon the Yeatman pea. I am, with great regard, dear sir,

Your most obedient servant,

Hazelwood, June 24, 1805.

JOHN TAYLOR.

I very much regret that indisposition, with which I was attacked severely at *E. Island* in January, hurried me off sooner than I intended, and prevented me the pleasure of seeing you there. I wish much to make a farmer of you in style.

I visited it in May, and again a week at the commencement of harvest. The crop is so vastly beyond anything my new manager has been accustomed to, with the finest prospects which can be conceived, and all the encouragement I could give him, he would despond. But from his last letter he seems to have gotten his spirits up, and I have sent express to bring him through.

I found I was correct in saying to you *I had 80 acres of the best wheat in Virginia*. When the knife was put to it I was present,

and could then have added, *I believe the best in the world, unless some favored spot in the Delta of the Nile may perhaps have equalled it.* The last 20 acres sowed was badly crippled by the winter. I however learn there is 800 *stout ricks, and some small ones*, and from the advice of my friends I am shipping to their mills in Richmond.

The political horizon looks so squally we can't guess what may be the change of times, and they promise me no price, but justice for all.

Should you have an opportunity, let Col. Venable know all is well. Tobacco getting up to pean price, and wheat 6s. and 6d.
August 7, 1807. FRANCIS WATKINS.

WHAT CROPS CAN BE GROWN TO PROFIT IN OUR PRESENT CIRCUMSTANCES AND WITH OUR FUTURE PROSPECTS?

[For the Southern Planter.]

Dr. Pollard and Col. Beverley say that wheat cannot be grown to profit, though our yield should average twenty bushels per acre; that is, I suppose they mean a living profit, or with a margin of profit sufficient to give the farmer a competence equal to the merchant.

Suppose we admit the reasoning of Dr. Pollard, as to the general meaning of putting in wheat. I would ask, Would the simple change of crop improve the habits of farmers so much, that they would do justice to the oat crop, while they would continue to do great injustice to the wheat crop, by the manner in which they handle it, from fallowing the land to marketing the grain? I think not. Indeed I am certain, that in our county there is a more general *utter* failure of the oat crop from year to year, than the wheat crop. But if you could induce farmers to sow thickly in August and September, would the result be any more satisfactory than the wheat yield? The oat crop seldom sells for one-half the price per bushel that wheat brings; and if you could double the yield wheat makes, would it pay? I have my doubts as to doubling the yield of wheat, unless he means to take the mere average of wheat, which he gives at eight bushels; then I have no hesitation in saying sixteen, or twenty-five bushels of oats, per acre are not paying crops.

But suppose Virginia was to produce eight million bushels of oats, instead of wheat, and other States also were to grow oats, the price of oats would become unremunerative.

Is there a better way? I think there is, and a way that demands our earnest attention. Dr. Ellzey's series of articles on green fallow crops, animal manures and commercial fertilizers, commencing in the August number of the *Planter* for 1879, and running through many numbers, will repay attentive re-reading. His strong and incisive statements in relation to the theories of chemists and

fertilizer men, as to the necessity of presenting plant food in a soluble condition, is perhaps the most important contribution to the stock of our *positive knowledge* that has been made since the commercial fertilizer craze took possession of the farming community. It shows that the theories of the past have been positive folly; that the cost of fertilizers have been considerably enhanced by the use of a worse than useless, nay a positively injurious agent—sulphuric acid; that *mechanical division* is all that is necessary to prepare plant food for their *capacities to digest and assimilate*; that consequently, the property of the acid to destroy water as the proper vehicle through which the mineral particles of plant food must be presented for their mastication and digestion, is perhaps the most injurious property it could possess, and especially when used in our hot and drouthy climate.

Everybody knows that the one dominating property of sulphuric acid, is to convert water into vapor or steam. As long as it remains sulphuric acid, this continues to be its dominating property. When, therefore, it is commingled with the soil, its perpetual tendency is to convert the moisture of the soil into vapor, and enable it to rise and escape therefrom; whereas, the normal condition and tendency of the soil is to cool and condense the vapors of the atmosphere, and thereby convert them into water, and thus provide the vehicle through which alone the minutely divided atoms of plant food can enter the mouths and vesicles of plant roots, "*which are provided with the proper acids for their disintegration*" and assimilation. This is the property and office of water in the soil. But when dissipated as vapor, it cannot perform these functions; hence the effects of drouths on plant growth. And the intermixture of sulphuric acid with the soil is only to aggravate the effects of drouth, as all observers must have noted. In moist climates, such as England, the effects may not be so serious, but in ours they are serious; and from this cause, mainly, comes the many complaints of the utter valuelessness of commercial fertilizers.

Dr. Ellzey has demonstrated the value of clover and peas as sources of nitrogen for growing crops; and Mr. Stewart, in the Ninth Annual Report of the New Jersey State Board of Agriculture, has shown, in a review of a letter of McLaws, that if we supply the necessary phosphates in a condition capable of being converted by the plant into phosphoric acid, corn can be grown in the Eastern States cheaper than it can be transported there from the West. In other words, the East can successfully compete with the West in growing corn. If it be true that the freight charges on a bushel of corn are more than the cost of the necessary phosphates to produce it—then we of the South also can compete with the West in corn growing.

It is needless to go into the chemical question. I will only say, that the Charleston people have succeeded in grinding the Charleston rock so fine that it appears to be soluble in water; or, in other words, as fine as family flour—as fine as necessary for the water of the soil to present an abundant supply of it to the roots of corn plants.

We have tried it for two years, with very satisfactory results, on corn cultivated as tobacco raisers are generally compelled to cultivate corn, and have seeded clover when we laid by the corn. We have now (September 15th) clover—seeded last week in July, when the corn was laid by—six inches high; and, thus far, we consider our chances for a good stand, permanently, far better than when seeded in wheat. Our last year's experiment was a perfect success.

There is only one question I would like solved, and that is: If we treat corn as it ought to be treated—with *thorough cultivation* from the planting till made—can we overcome our usual long drouths? That is to say, Will thorough cultivation enable the soil to condense moisture enough from the atmosphere to meet the wants of the plants when tasselling or shooting? If thorough cultivation will effectually overcome the drouths of our summers—then with two years' rest in clover, and which clover I would hog down, feeding two ears of corn to each shoat per day while they graze on the clover, and keep as many hogs as my clover would carry. Starting corn with 500 pounds per acre of Charleston rock, I make sure a clover crop of first quality, and capable of summing ten shoats per acre; and with two ears of corn each per day, my shoats that were pigged March 1st will be ready to go into the clover as soon as it is in full bloom, and they will never destroy it so much that it would bare the surface—at least I would regulate the number to that point that would keep the surface protected. I allot one barrel of corn to each shoat; and by the time he has eaten that, he will weigh at least one hundred and fifty pounds, and will always bring eight dollars. If I can only raise five barrels of corn per acre, I can only mature five shoats per acre; but that would yield me \$40 per acre. And if I only grew thirty acres, that would give me an income of \$1,200 per annum. And any man, not in his three-score years, can, with a sulky plow and cultivator, raise that, and be independent of the inefficient and impertinent labor of these troublesome times, which is an important factor for the moment.

Besides, if we can certainly accomplish these results with the cultivation of corn, we need have no cares about our corn and hog crops, and need not, therefore, do more than pull the corn and feed it in the shuck, saving hay enough for the teams and stock, and get rid of handling the corn stalks; that is, reduce the labor on the farm to its minimum, and its care also.

There are many questions of detail which must be passed over for the present. I only aim to suggest.

S * * * *

A forger who was sent to the Pennsylvania penitentiary in 1852, and has just been released, finds that his house and lot, then worth \$1,500, now give him a fortune of \$40,000, owing to the increase in the value of land. He ought to be able to lead an honest life on that sum.

Wolsley's victory, it is estimated, will cost England from \$50,000,000 to \$100,000,000. When they pay it, British tax-payers will be apt to think that John Bright was right when he declared the war unnecessary.

THE NEW FOOD-FISH.—(*Sebastes dactyloptera*.)

Mention was made last week of the discovery by Captain Collins, in the service of the United States Fish Commission, of a new and promising food fish. The fish was taken, it will be remembered, while trawling for tile fish in deep water off the south coast of Long Island.

At the National Museum, in Washington, the fish was recognized as the *Sebastes dactyloptera*, young specimens of which were taken in great abundance by the Fish Hawk, off Newport, R. I., in 1880, along the edges of the Gulf Stream, in 100 to 150 fathoms of water.

The fish recently taken were the first adult specimens caught off the American coast. Professor Goode states, however, that the fish is found in great abundance around the Madeira Islands, where it is popularly known as the "catseye," and highly esteemed as a food fish. In general appearance it closely resembles the red perch or Norway haddock, which is so plentiful along the coast of Maine. The fish run from two to three and a half pounds in weight.

*[We have been intending for sometime to urge upon the attention of farmers the importance of fish culture. There is scarcely a farm which has not a running brook on which a fish-pond may not be located, and may be at the same time utilized for ice. With a little attention, a crop of food-fishes may be made more abundant than that of fowls, and at much less expense. And what can better supply a farmer's table; and, when near to a market, furnish a better source of income for the outlay involved?

The *carp*, and other fishes, will be supplied free of cost from the agents of the State and Federal Governments, on proper application. So that it remains an easy and practical matter for any household to have its well-stocked fish-pond.—Ed. S. P.]

AGRICULTURAL NOTES.

[For the Southern Planter.]

In traveling about the State a good deal this summer I have seen some things which may interest your readers. Though I am an ex-farmer I have not ceased to take an interest in all that appertains to the farm and farming interests.

SEASONS AND CROPS.—The seasons in general have been favorable, particularly so since the middle of July up to the date of this writing. Rarely have tobacco planters ever had a season more favorable to tobacco in every respect since the date named, and the crop probably will be the best and largest made for several years.

THE WHITE BURLEY TOBACCO has been tried in numerous localities. The growth I saw (in Nottoway) was very large and leafy. Some plants measured seven feet from tip of one leaf to the tip of the opposite leaf. It seems to be more difficult to keep the worms off this than from ordinary kinds as the leaves grow close on the stalk, and there-

fore the worms can hide themselves better. It is liked by some planters, but not by others. It remains to be seen how it will pay. Unless this or some other variety can be grown which afford better remuneration than the staple made in Middle Virginia, it ought to cease to be cultivated, for it has ceased to pay expenses, except in special cases.

For several years I have watched the *Lespideza Striata*, or Japanese Clover, about which so much was written a few years ago. The seed of this were sown some seven or eight years ago, on a gravelly and very thin ridge in Nottoway by which the road runs. Where the land has been cultivated the plant has disappeared—but in the space between that and the road which has been left unstirred, it has thriven and formed a sod. In the opposite fence-corners it has also formed a sod, even in spots where nothing else would grow. Moreover, it has spread along the road-sides for several hundred yards. Stock are said to like the plant, and if so it does seem practicable to seed old fields lying out in it and thus form a good sod for sheep, for which it looks as if it might be particularly suitable. I hear it grows high enough to make good hay in the south.*

CATTLE AND SWINE seem to be scarcer this year than usual, on account of the short crop of provender and corn last year. The fine grass this fall ought to bring the cattle to the winter in fine plight and a plentiful crop of corn ought to push the hogs. Quick maturing breeds would now be very serviceable. The white-oak mast is very good.

ENSILAGE.—I have not found this system much practised and when tried, sometimes very slovenly done. As far as tested, it has given satisfaction. One farmer has used it this season for the fourth year and likes it more and more. For beef and stock cattle I think it is very valuable, because it enables the farmer to put up a double supply of stock feed. The testimony of the one hundred whose trials are reported by the United States Department of Agriculture, is almost unanimous in its favor. Many hesitate to try it because of expense, but a one horse power seems to afford sufficient power in cutting it up, on a moderate scale. If ensilage prove a success, as I believe it will do, I consider it a most valuable step in advance, especially to the farmers of Eastern Virginia.

*Since writing the above, I have seen another experiment with *Lespideza*. The farm on which it was tried lies in the northwestern corner of Brunswick county, on Nottoway river. The soil has a strong, red-clay subsoil. The seed were sown on it some six years ago, and the plant had kept on growing and spreading ever since. It had formed a good sod on a red gall, though not originally sown there. The proprietor considered it was good—especially for sheep.

THE NATURAL RESOURCES of the country were brought into active requisition this year on account of the short crops of last year. Corn sold as high as \$1.30 in remote districts. To supplement the bread crop and the small income from tobacco and wheat, salable stuff, such as railroad ties, tan bark, walnut logs, cord wood were sold in large quantities. One dealer in one of the old counties told me he had sold over four hundred car-loads of these articles. In another old county I saw these articles hauled twelve miles or more, this too where tan-yards had been closed up in former years for want of bark.

How many years the country can stand this drain and where such supplies are to come from when the present supply is exhausted, are questions often asked but seldom answered. Certainly that rare establishment in Virginia, the tan-yard, will have to go abroad for supplies if it ever becomes an institution again. Our people can talk politics—run country stores, beat the world in tournaments, but when you come to matters of this kind—such as manufacturing leather, shoes, wagons, hoe and axe helves, &c., they have a hollow place, instead of a bump on their heads, as old Mr. Ruffin used to say.

SMALL FARMS vs. LARGE FARMS.—After a long test I think this question is practically settled. In Eastern Virginia I have not seen half a dozen large farms worked on ante-bellum plans, which did not bring the workers of these into loss. It is not an impossibility for such farms to prosper and pay, but it is risky business. There are however many cases where small farms have proven profitable. For the amount of capital necessary for a small farm, it is doubtful whether a fair return can be more surely obtained by any other industry.

PROPER ROTATION and progressive improvement of land, without bought fertilizers if possible, or with them if properly used, is the great want of Virginia farming. Mother earth is generous, but she cannot stand such treatment as is alas! too often cruelly and wantonly dealt out to her by her sons.

So, Mr. Editor, keep the motto always prominent: "No grass, no stock; No stock, no manure; No manure, (home made) no permanent improvement of land." And I will add, No improvement of land, starvation or emigration.

RICHARD IRBY.

Nature made no two leaves to resemble each other, has endowed our souls with a still greater diversity, and imitation, then, is a kind of death, since it robs each of its individual existence.

BAT GUANO IN TEXAS.

The progress of railway extension in Western Texas has led to the development of the beds of bat guano in certain caves in Uvalde county. A recent visitor says that there are two of the bat-inhabited caves which have been partially explored. The entrance to the smaller, or Cibolo, cave is about fifty feet high and twenty-five feet wide. The passage widens gradually for a distance of about two hundred and fifty feet, when the outer cave is reached. The bottom is of guano. The walls are of limestone, uniting nearly two hundred feet above in a grand dome. The cave is as dark as Egypt. There appear to be neither stalagmites nor stalactites. This cave is three hundred or four hundred feet in diameter, and the floor is covered with about thirty feet of guano. In some parts it is believed to be much deeper. The atmosphere is very dry, and five years ago the guano caught fire, the whole surface being burned over to the depth of about four feet. Since then eight feet of guano have been deposited, so that we have proof that the fertilizer is being deposited at the rate of more than a foot and a half a year. On the inner side of the outer cave, in the side of the dome, about one hundred and twenty feet from the floor, is an opening about six or eight feet in size. Through this all the bats go to an inner cave, which has never been explored. It is believed, however, to be very extensive because of the immense number of bats that daily sleep in it, and because at the time of the fire in the outer cave great quantities of smoke escaped through the crevices in the rock near the Cibolo river, on the opposite side of the hill, two miles and a half from the main entrance. This inner cave is believed to be fully two miles long and very broad. The Uvalde cave is said to be about six times as large as the Cibolo cave. It differs from the latter in being moist, instead of dry. There is no running water in either cave. The district is quite hilly, and is composed altogether of a limestone formation. In the abrupt hills many caves are known to exist, and all of them are inhabited by bats; but only the two mentioned, it is believed, are of sufficient extent to warrant working for the guano deposits. The first shipment of guano was made from Cibolo cave but a short time ago. It is claimed that analysis shows the guano to be worth from fifty to sixty dollars a ton. The Uvalde cave deposit has not been touched. It is said that a factory for the production of sulphate of ammonia is to be set up at Uvalde by the company which owns and works the phosphate deposits at Charleston, S. C.—*New England Farmer.*

GERMAN MILLET.

On land adapted to its growth, there is no forage crop more profitable to the farmer than German millet. Its yield is immense, producing on an average soil, with ordinary seasons, from three to five tons per acre. When cut at the proper stage and well cured, stock of all kinds are fond of it, preferring it generally to any other hay. Its superior fattening qualities are chief among its recommendations. Two crops can be grown in a single season, or a crop of millet secured after the wheat or rye, or oat harvest. Objection is sometimes made that it is a hard crop on land, but such is not the experience of those who have given it a fair test.

Three things are essential to a good crop, in addition to the requirements of a favorable soil, viz. : First, the land must be thoroughly prepared; second, sound seed; and third, a favorable season. In preparing the land it should be thoroughly plowed and well pulverized. The seed sown should have been grown especially for the purpose, and not gathered from a broadcast crop. The proper way to raise the seed is to sow thickly in drills, eighteen inches to two feet apart, and work one or two times with the cultivator. On a rich soil the yield of seed thus treated is immense. Seed, when good, present a very uniform appearance in size. The season requires a moderate amount of moisture in the beginning, followed by one or two gentle showers. Seed should never be sown when the ground is too dry. River and creek bottoms, and low, flat places, are best adapted to this crop. Seed may be sown as early as the frost is out of the land up to as late as the 1st of August. With a favorable season it does well after the wheat crop has been harvested. The time for mowing depends upon the uses for which it is intended; if for feeding the horse, it should be cut when in the flower, and for mules, cattle, or sheep, when in the dough state. There is no hay crop that stands the weather so well if carefully ricked or stacked, and when harvested it leaves the land in excellent condition for any other crop. Every farmer who has land suited to its growth, should raise more or less of it. With a favorable season a crop will mature in forty to fifty days from the time of seeding. The amount of seed to the acre depends upon the character of the land and the uses for which it is to be applied. If for horses, a bushel of seed to the acre is best, but if for cattle, half a bushel to three pecks is abundant. The seed should be covered very lightly, and, when convenient, followed with the roller.

It will not pay to put millet on poor land.

INDIAN CORN IN THE SOUTH.

EDS. COUNTRY GENTLEMEN—Your able correspondent, B. F. J., page 829, gives a good article on corn in the South. I know he will not think less of me if I take up the glove and reply from my stand-point. He says: "There is one fact in regard to growing corn in the South which is not generally understood. Given as rich a soil as any in the North, it is not possible to produce more than half as much corn to the acre, because of the excessive heat, which requires planting at nearly double the distance apart required at the North. It has been supposed that the poverty of the soil was the reason why corn at the South was so spread out upon the land, but it is now recognized that under the intense summer heat, the plants require a free circulation of air, or they 'draw up' and refuse to ear." I am thankful that the odium is taken from my people, which I dare not do, and the blame placed on the "poverty of the soil" and "the intense summer heat." My father, grandfather and great grandfather were natives of Virginia; my mother's family was likewise thus early imported into the South. The South is no cabbage patch. Like all other countries, except Illinois, we have some "poverty of the soil," but we just ask where can be found fifty miles square of richer, deeper soil—may I not ask, 100 miles square—in one body? Now as to the "intense summer heat." There is no record of as intense heat at any place in the South that can be shown since my day (76 years), as has been very often recorded, even in Eastern and Northeastern Illinois.

But to facts that are facts, Dr. John Parker of Columbia, S. C., (my birth-place), reports to a South Carolina fair, properly certified (and none has denied the fact), the largest yield of corn in America—200 bushels, and a few quarts over. I have a slight pleasure in saying to B. F. J. that in my boyhood days I passed over said land, hunting rabbits and birds, for after September 8, 1821, until division, I was one of four children who owned said land. You see where the "slight pleasure" comes in. The largest yield of corn known grew on land of which I was, when a boy, part owner. So much for poor land and intense heat. My farm book, March 16, 1849, gives:

"Planted an acre of Golden Alleghany corn to-day, as follows: Prior to Feb. 15th, I had the land turned over with two-horse plows; began to haul manure on it on the 13th; hauled 19 loads of about 20 to 25 bushels per load—say 500 bushels; this was spread broadcast; the subsoil plow then ran two feet apart (the east side best subsoiled); the land then harrowed well. Rows marked off 3 feet apart; corn then drop-

ped for a stand—10 rows, one stalk every foot; 10 rows, two stalks every foot; 10 rows, one stalk every two feet; 10 rows, two stalks every two feet; 10 rows, one stalk every three feet; 10 rows, with two stalks every three feet; 10 rows, two stalks every four feet. I then scattered 100 bushels of cotton-seed (rotten), and left 50 bushels to manure around the hill. It took one-half bushel of corn, dropped by myself; Mr. Aiken, a visitor from Indiana, helped me. This Golden Alleghany had larger growth than any of our Southern corn."

"Sept. 18th, gathered Golden Alleghany corn, A. K. Montgomery and John Hughes present; both citizens and planters. Lot No. 1, 8 barrels; No. 2, $4\frac{1}{2}$; No. 3, 9; No. 4, $8\frac{3}{4}$; No. 5, 9; No. 6, $9\frac{1}{2}$; No. 7, $9\frac{3}{4}$, common flour barrel—will average about three bushels. I began to plant on the west side, next to fence, where corn was 3 by 1 foot, one stalk; the last lot was on the east side. 3 by four feet, and two stalks. Best subsoiled; east side and largest yield, last 10 rows. $9\frac{3}{4}$ barrels, 3-foot rows and two stalks every 4 feet.

Observe, first of 10 rows, 3 by 1 foot, one stalk, gave 8 barrels; next, with two stalks, gave only $4\frac{1}{2}$ barrels; 3rd lot, two feet distant, in drills, and one stalk, gave 9 barrels, yet the last lot, 3 by 4 feet, and two stalks only gave $9\frac{3}{4}$ barrels; where most distance, only three quarters of a bushel, say over 3 by 3 feet, and one stalk. Of course one trial shows that we can lose if there are too many stalks, as I am sure we can by too few. I have made 90 bushels from 4 foot rows. Always after, perhaps, 1833 or 1834, I drilled, single stalks, about 22 inches apart in the drill. A. K. Montgomery who assisted in gathering, made 103 bushels in rows under 4 feet. His father, for perhaps scores of years, always planted at five feet, and rich land; crops 60 to 70 bushels; same land at four feet, and the corn stirred often, should have made 10 bushels more. My rule was, the richer the land, the more distance for cotton, and less for corn. An old neighbor said that on rich land cotton should be closer planted. I asked him about the Yazoo bottom; rows 9 feet and stalks four.

I have had cotton twelve feet high and not much of a crop—too thick to spread, and like saplings, grew up to get light.

The fault is the southerner is crazy on cotton, just as B. F. J. charges on Southern Illinois. I pleaded with my brethren South for mixed husbandry forty to forty-five years ago; had they followed my practice, we would not even now be in the Slough of Despond.

Clinton, Miss.

M. W. P.

FISH FARMING.

By attaching a pump, propelled by the wind, to a well, says the St. Paul *Pioneer Press*, you can supply a basin from 50 to 70 feet in diameter, and six to eight feet deep, with water sufficient to raise several thousand carp or other fish. The cost of this pond and appurtenances need not exceed fifty dollars. The bottom and sides need to be cemented thoroughly. When the basin is complete, place in it a small quantity of floating weeds. If you intend to raise carp, do not place other fish of a predatory character in the pond. The spawning will occur during the spring months, the female laying from 50,000 to 500,000 eggs. The eggs will adhere to whatever they touch, and will soon hatch. The green senm of a partially stagnant pond is fine food for the young fish. Mud in the bottom of the pond is beneficial. The fish will feed readily on kitchen-garden refuse, such as cabbage, leek, lettuce, hominy or other substances. Water seldom becomes too warm for these fish. During freezing weather they bury themselves in the mud at the bottom of the pond. While in this condition they should not be disturbed. In a pond of given dimensions several thousand fish have annually been taken. If weeds and grass grow profusely about the borders of the pond, so much the better for the fish. In two years' time you can have a constant supply of sport and food, and the advantage of a pond to assist in beautifying your home.—*Western Plowman*.

INDUSTRIAL EDUCATION IN THE PUBLIC SCHOOLS.

There is a growing feeling among the students of industrial problems that our whole conception of education in general, and of industrial training in particular, needs revision and enlargement. This feeling is based upon such easily observed facts as the following:

1. Paupers are on the increase.
2. Our schools too often educate their pupils out of harmony with their environment, thus justifying the charge that education (falsely so called) unfits its possessors for useful industry.
3. The simpler and less important positions in the world's workshop are as a rule greatly overcrowded, while in the upper stories there is a vast amount of unoccupied space.
4. The work done in the lower stories is often exceedingly shabby.
5. Many who aspire to the upper stories fail to enter—or, if they apparently enter, soon end in failure.
6. The chosen few who truly enter, and build up magnificent industrial fabrics, with the splendid fortunes which such fabrics imply, fail to educate their children to carry on their good work, or to do work of similar value in some other department of useful industry.

7. A whole community of prosperous workmen may be well nigh reduced to beggary by the incoming of some new invention, or by change in the fortunes or tastes of consumers.

8. When old industries are swept away, and new ones established on the wrecks, there is usually little power on the part of the workmen to adapt themselves to the new conditions.

9. The relentless law of the survival of the shrewdest and most unscrupulous, instead of the Christian law of mutual consideration and co-operation, too generally prevails among individuals and all kinds of human organizations.

That all education should be industrial, and that everybody should be industrially educated, we believe to be a perfectly tenable proposition.—PROFESSOR H. H. STRAIGHT, in *Popular Science Monthly* for October.

FARMING.

England has now been in cultivation for more than one thousand years, yet by intellectual farming and a liberal use of fertilizers, the soil is still made to produce more per acre than many farms in this country, which less than one hundred years ago were covered with a very good forest. A great many farmers will argue that they have no money with which to purchase fertilizers, and that their barn-yard does not begin to supply the quantity. To them we can say, Do like our cousins across the water: have a flock of sheep, and let them manure the land. To accomplish this end, more wicker hurdles must be provided, so that lots large enough to contain the sheep can be enclosed, and the sheep kept in hand. Sow turnip or some other seed which will grow on comparatively poor land, that the sheep may have some pasturage. When this is done, and the crop begins to grow, divide off a portion with the hurdles, place the sheep inside, and while eating off the crop their droppings will be deposited on the land. Continue moving the lot from one place to another until the entire field has been gone over. If the land is very poor this mode of treating it should be kept up at least two years; then in the spring plant wheat or oats, to be followed as soon as harvested by another turnip sowing, which is to be fed to the sheep in the same manner as described above, and thus raise two crops, one for the master and the other for the sheep. The animals will improve in wool growing qualities, increase in numbers, add to the supply of manure, and all the while enriching the owner. There is no better manure than sheep droppings, and by following the above mode of sowing and applying it, marked benefits will result in a short time. The inevitable law of nature to return something for what is taken away must be adhered to.

I GO FOR CORN, WHEAT AND TOBACCO.

Mr. Editor,—When William Cobet, the great English radical, spent some years in this country, he advocated with great zeal the cultivation of *ruta бага*. John Randolph, of Roanoke, was then member of Congress from Virginia. Some question, of new and doubtful policy, was introduced in Congress. Randolph, who was a good conservative, opposed it, and in the course of his argument he cried out, in his peculiar way, "Mr. Speaker, we in Virginia go for corn, wheat and tobacco, and we *dam* the *ruta бага*." The question now is, Shall we abandon the *staple* crops of corn, wheat and tobacco and give our attention to sorghum, grapes, apples, &c.; to which might be added broom-corn and teasels—the one yielding, besides the brush, which will always be in demand for brooms, a good crop of seed, equal in value to a crop of oats; the stalks and fodder are equal to those of corn. The teasel is wanted by all manufacturers of yarn cloth; no substitute has been found for it. It is cultivated with profit in New York and New England—making from 100,000 to 300,000 burrs to the acre, and selling at from two to three dollars per 1,000 burrs. These are all specious crops. I like the old crops better; but the farmer is never satisfied. Virgil, two thousand years ago, described the farmers of his time as a dissatisfied class, and he exclaims: "O, fortunate farmer, if you only knew how well off you are!"

We are grumblers now. We want larger profits than we get. Yet no good farmer has failed who has cultivated these crops with industry, guided by intelligence; and why should they? Indian corn is well suited to our soil and climate. With deep and frequent tillage, it never fails. It makes more nutritious food for man and beast, to the acre, than any other plant. The wheat crop has never failed to bring us in some income, even at six or eight bushels. Now it is thought that it brings us in debt at twenty bushels to the acre. I do not think so. Sancho said he did not want any better bread than that made of wheat. The whole world is now of his opinion, and the demand is constant for all we have to spare. Wheat after corn, without fertilizers; we expect a crop of six or eight bushels, and we are not disappointed. On a clover field, well plastered, and the clover turned under in August, we expect a crop of twenty or thirty bushels, and we get it. No crop is more certain than wheat on clover, fallowed, and the land improved under this system.

In regard to tobacco: In spite of the bulls of popes and the counterblast of James the First, it is now in more general use than any other luxury, and commands a higher price than it did two hundred years ago. I regret its cultivation has been abandoned in some portions of this State. I know of no substitute that the small farmer can avail himself of. With the help of his children he can make a hogshead or two every year, and thus have a certain income of one or two hundred dollars every year. Under the present system, they have no income. They raise a little corn and wheat, and have none for

market. They are dependent on their fowls and dairy to clothe their families and purchase groceries. If they lose their horse or cow, they have no means of replacing them; they have no money and no credit.

Our representative in Congress, General Gordon, used to address directly the one and two-hogshead men. He told them that he had so high an opinion of their patriotism, that the hope of the country was placed on them; if they but growled, the British lion would retire to his jungle.

It is a mistake, that the culture of tobacco tends to the impoverishment of the farm. My observation, the result of a long life spent in the midst of the tobacco region, is, that the good planter improves his farm more, makes better crops, lives better, leaves a larger estate to his children, than the farmer who confines himself to corn, wheat, sorghum, &c.

The tobacco crop requires thorough preparation of the soil, thorough tillage, and the making and application of large quantities of manure, and the growing and turning in of good crops of clover. All the operations of the farm are conducted with industry and intelligence. It was my good fortune to live for twenty years next neighbor to one of the best farmers in the State. I saw him, in this time, double the number of acres of his farm, and double the value of the whole farm, by the cultivation of tobacco. This is the sum of the whole matter: We should stick to the crops that suit our soil and climate. We should endeavor to increase these products, and we should lessen the cost of their production. There is a farmer in every neighborhood that is doing this. Let us follow his example.

In my last article, I said some of our best farmers had reported that plaster had ceased to show its usual effects on their grass and other crops. This, I think, is owing to their land being saturated with plaster. Manipulated fertilizers which are in general use, contain a large amount of this mineral, put in for the sake of bulk and weight. The soil already containing plaster, I am not surprised that clover and other crops do not show its effects.

The Plains, Va.

OLD FARMER.

ROTATION OF CROPS.

Correspondence Farmers' Review.

PARIS, FRANCE, September 9.

What is the true theory of a rotation of crops? Doctors differ on the point. There is a school in this country that reduces the question of the fertility of the soil to a matter of give and take. Here, they say, is a general table of analyses of soils, and also of cultivated crops; of certain manures, etc. Nothing easier than to calculate the total yield of a crop, to know the quantity of phosphates and of potash, etc., carried off. The analysis of the manure will enable the quantity of those salts to be estimated, and requisite to be returned to the soil; if

in excess, the richness of the land will be augmented. It is further laid down, that cereals and industrial plants draw largely on the soil for nitrogenous principles; but as these crops are succeeded by forage plants, the deficit is made up by the intervention (hypothetical) of atmospheric nitrogen. Further, the necessity to practice a rotation of cropping, is explained by plants not requiring the same mineral substances, so that what one leaves the other will appropriate; and that, after a lapse, say of five years—thanks to periodical manurings and dissimilarity of tillages—the alternate exhaustion and the renovation of the soil will be found equalized.

Now, what is our stock of precise, demonstrated knowledge on this subject of rotation? It is exact, that the mineral food removed must be restored. By the successive cropping of lands in Sicily with wheat, the phosphates had been exhausted, and the soil has become impoverished. The same fact was in process of realization in the North of France, till M. Corenninder called attention to the necessity of employing phosphates, and since fertility has returned. Now for plants, as for manures, there is no constancy either in mineral or nitrogenous, or even in any other elements. Analysis shows that a large number of different manures vary in composition, from one to four times in the same element. Similarly for plants; wheat, for example, where the percentage of nitrogen, as in gluten, varies from one to three. There are analogous differences for the potash and phosphoric acid carried off. Hence there is no mean, no Procrustean standard, that can be declared, off-hand, applicable to a special soil. Strictly speaking, each particular case demands a new analysis. One field may produce a forage five times more nutritive than another.

A popular error exists, that Boussingault asserted forage plants take nitrogen directly from the air; even his latest experiments demonstrate the exact contrary. Then the attempt has been made to explain the restitution of nitrogen to the soil by the agency of meteors and rain. It is a fact that ammoniacal salts and nitrates are constantly present in the air, and conveyed, along with other saline and dust matters, to the soil by the rain. But the latter falls on the just and unjust alike; upon all cultures indistinctly, not upon any particular rotation, and not specially on forage plants. It is assumed, but not proven, that electricity nitrifies the ozone of the air in the interior of the soil, by a union with hydro-carbonaceous matters; or effects a similar end in the interior of plants, by their starch, sugar, etc. We know, however, that the ozoteous matters in the soil can be nitrified, but that is not an augmentation of richness; also, Cavendish has shown, in 1784, that an electric

spark traversing an atmosphere enriched with oxygen, can produce nitric acid. Now, if electricity makes ammoniacal salts and nitrates in the atmosphere, that intervention is for all rotations and crops alike.

It may be laid down as an axiom, that every system of culture which does not bring, from an outside source, the materials, whether nitrates, phosphates, or potash, etc., rare in a soil, and carried off by the produce, must ultimately suffer in fecundity. There is a necessity, apart from these food considerations, to rotate crops; the plan affords the means for extirpating weeds, for cleaning the ground, and of destroying insects; since if the latter, peculiar to a distinct crop, be deprived of its special food for one or two years, it must die of starvation. To keep a soil rich, depend upon manures, rather than on the air.

THE TAG QUESTION.

Mr. Editor,—I have had no disposition to engage in the discussion of the above subject, as it is no business of mine, except as it relates to me as a farmer; but in your issue for November, in commenting on the action of Clinton Grange, No. 220, on the "fertilizer tag question," you say: "That the Commissioner has the legal right, and, indeed, ought to affix a tag or brand on all fertilizers inspected and licensed by him, there can be no doubt or dispute." If you are right, then I misunderstood my legal right, and failed to perform my duties when Commissioner of Agriculture. But that you are wrong, I think is "beyond doubt or dispute." The law enacted before the creation of the Department of Agriculture, and which has never been repealed, expressly makes it the business of the *manufacturer* to affix a brand to every bag of fertilizer offered to be sold in the State, stating the percentage of moisture, phosphoric acid, potash and ammonia claimed to be contained in it. The law creating the Department of Agriculture, nowhere gives the legal right to, or makes it the duty of, the Commissioner to affix any brand or tag whatever to fertilizers. In the first circular I issued to manufacturers requiring samples of their goods for analysis, I called their attention to this old law concerning brands, though I did not see it was my duty more than that of any good citizen to see it enforced. It is the duty of the Commissioner of Agriculture to have analyzed such fertilizers "as he may deem of importance." Then the farmer can compare this analysis with the brand on the bags of the manufacturer, and decide whether the brand comes up to the analysis, and make up his mind whether to purchase. And while the

Commissioner may exclude from market all fertilizers he deems of no "practical value;" yet, if the farmer chooses to buy by the brand on the bag, or without any brand, the courts have decided he has no legal redress, and cannot refuse to carry out his contract of purchase. The Editor says: "The only open question is, How far the price of the *tag* or *brand* is in excess of its real cost or value?" I do not see that the tag has any value, without analysis. If I had used it, and found any excess over cost, I should not have known what to do with this excess; for the law expressly appropriates \$5,000 to the Department of Agriculture per annum, and says: "No greater amount shall be expended for the purposes embraced within this act, during any one year."

THOS. POLLARD.

[As we have not critically studied the law in regard to the powers, or duty, of the Commissioner to affix his tag or brand to all fertilizers analyzed under his authority, we deemed it proper, under principles of common sense, that he should do so, in order that the farmers might know, at a glance, what fertilizers had received his approval. If the law does require the manufacturer to affix his brand on all bags, stating the percentage of elements, by which, in case of false branding, the farmer may be protected under the penalties imposed by the law, and the redress given him—this, in our mind, does not in any way make it less the duty of the Commissioner to affix his official stamp on all manures analyzed by him as a guaranty of purity and a protection, both to the farmer and the manufacturer. Whether the Commissioner has a right to charge, either to the manufacturer or the farmer, a price for such a stamp or tag, is another question. The court has decided that he has not, and so the question ends. But still, as a matter of convenience and protection, such a tag should be attached.—ED.]

THE HOLLAND HYDRO-CARBON RETORT.

Among the most interesting articles exhibited at the State Fair, was the Holland Hydro-carbon Retort, of which that public-spirited gentleman, Mr. Edwin G. Booth, is the owner for the State of Virginia. This is a very simple and inexpensive contrivance that may be applied to any stove, fire-place, steam-boiler, or wherever heat is needed, and by means of which any desirable amount of heat may be produced, at a minimum of cost, and a maximum of convenience and safety. To make a fire by it is about as easy as to make a light with a match and a gas-jet. The combustibles are petroleum and naphtha and water, which in combination evolve hydrogen gas with a heat-giving power, perfectly under control, capable of cooking a beefsteak in two minutes, or running a locomotive at a speed of sixty miles an hour. As exhibited at the Fair, the apparatus was applied to an ordinary cooking-stove, to which it supplied all the heat necessary for cooking, at a cost, as stated by the person in charge, of about one cent an hour. When, in addition to this saving of cost, is considered how much trouble is got rid of in the making and keeping up of fires, how desirable it is to be able to regulate heat so as to increase or diminish it in a moment

or keep it perfectly steady for hours; and how important it is to be able to lessen the risk of having our houses burnt over our heads at any time, we are obliged to believe that this most valuable invention will soon come into general use for domestic purposes. Actual tests have also shown that it possesses equal advantages over former methods as a power-producing agent. In proof of this, the following note from the patentee to Mr. Booth, published by us some days ago, is reproduced:

NEW YORK, October 5th, 1882.

Dear Sir,—The "C. Holland" locomotive took the 3:05 P. M. passenger train from Patterson to Jersey City, and the 3:55 passenger train from Jersey City back to Patterson, both heavy trains and short time; and the actual running time was at the rate of sixty miles per hour. Started at each end with 130 pounds of steam, with the pop-valves blowing off, and went into the depots at each city with the same amount of steam and the pop-valves blowing off, and ahead of time on each run.

We burned out seventeen gallons on each trip, which, at three cents per gallon, would be but fifty-one cents for each trip, and less than two and three-quarter cents per mile. Yours, C. HOLLAND.

Another advantage claimed for this invention, but of which we have not yet witnessed any exhibition, is that while performing its task by day in the production of heat, it generates a gas that can be easily saved and used at night for purposes of illumination.

Mr. Booth in purchasing, as he did at a round sum, the right for the State of Virginia, was prompted, as we understand, rather by philanthropic than business considerations, and it is his wish to see a company raised that will undertake to place the invention within easy reach of our people.

P. S.—Since the above was put in type, we have been shown the following report of the Committee of Awards at the Fair:

"Honorable and special mention is made of *Holland's Hydro-Carbon Retort*, exhibited by E. G. Booth, Esq., who is the proprietor for Virginia. This is a simple contrivance by which water is decomposed, and hydrogen gas, which is highly inflammable and generates great heat when burning, becomes a convenient and cheap substitute for coal and wood in all cases where heat is required. It was exhibited as applied to an ordinary cooking-stove, and did its work well, without dust, or smoke or smell. It is said to be efficient in generating heat in steam engines of all kinds; but this feature Mr. Booth was unable to show, as he failed to secure in time for the Fair a suitable retort. As no premium was offered in the Society's catalogue for such an invention, the committee took the liberty of attaching the blue ribbon, and recommend the bestowal of a diploma."

[We copy the foregoing article from the *Industrial South*, and have nothing to add to it, except to refer our readers to our own articles on the same subject, in our issues of October and November of the current year.—ED. S. P.]

IN THE WHEAT FIELD.

BY PAUL HAMILTON HAYNE.

When the lids of the virgin Dawn unclose,
 When the earth is fair and the heavens are calm,
 And the early breath of the wakening rose
 Floats on the air in balm,
 I stand breast high in the pearly wheat
 That ripples and thrills to a sportive breeze,
 Borne over the field with its Hermes feet,
 And its subtle odor of Southern seas;
 While out of the infinite azure deep
 The flashing wings of the swallows sweep,
 Buoyant and beautiful, wild and fleet,
 Over the waves of the whispering wheat.

Aurora faints in the fulgent fire
 Of the Monarch of Morning's bright embrace,
 And the summer day climbs higher and higher
 Up the cerulean space;
 The pearl-tints fade from the radiant grain,
 And the sportive breeze of the ocean dies.
 And soon in the noontide's soundless rain
 The field seems graced by a million eyes;
 Each grain with a glance from its lidded fold,
 As bright as a gnome's in his mine of gold.
 While the slumbrous glamour of beam and heat
 Glides over and under the windless wheat.

Yet the languid spirit of lazy Noon,
 With its minor and Morphean music rife.
 Is pulsing in low, voluptuous tune
 With summer's lust of life.
 Hark ! to the droning of drowsy wings,
 To the honey-bees as they go and come,
 To the "boomer,"* scarce rounding his sultry rings,
 The gnat's small horn and the beetle's hum;
 And hark to the locust!—noon's *one* shrill song—
 Like the tingling steel of an elfin gong,
 Grows lower through quavers of long retreat
 To swoon on the dazzled and distant wheat.

Now Day declines ! and his shafts of might
 Are sheathed in a quiver of opal haze;
 Still through the chastened, but magic light,
 What sunset grandeurs blaze !
 For the sky, in its mellowed luster, seems
 Like the realm of a master poet's mind—
 A shifting kingdom of splendid dreams—
 With fuller and fairer truths behind;
 And the changeful colors that blend or part,
 Ebb like the tides of a living heart,
 As the splendor melts and the shadows meet
 And the tresses of Twilight trail over the wheat.

Thus Eve creeps slowly and shyly down,
 And the gurgling notes of the swallows cease,
 They flicker aloft through the foliage brown,
 In the ancient vespèr peace;


*The *humble*, or as commonly called, "*bumble bee*."

But a step like the step of a conscious fawn
Is stealing—with many a pause—this way.
'Till the hand of my love through mine is drawn,
Her heart on mine, in the tender ray ;
O hand of the lily, O heart of truth,
O love, thou art faithful and fond as Ruth :
But I am the gleaner—of kisses—sweet,
While the starlight dawns on the dimpling wheat !

THE FERTILIZER-TAG QUESTION.

In our last issue we published the proceedings of the *Clinton Grange*, No. 220, on this subject. We added a note, which showed we knew but little about the subject as then stated; and yet we thought the Commissioner had a right, and should attach to all fertilizers inspected under his authority a *tag* or *brand*, and to charge a reasonable price therefor; but it seems the law requires the proprietors of fertilizers to *brand* their goods at their own expense. The question went into the courts, and we have since received the *brief of John Howard, of counsel for the complainants*. Like all other legal arguments from the pen of Mr. Howard, this is couched in good and clear English, and presents the case of his clients in a very forcible manner. The decision of Judge Fitzhugh did not, therefore, surprise us. We have no part in the controversy, except so far that the farming interests of the country may be fairly dealt with. These interests are safe, we think, in the hands of our Commissioner, Dr. Blanton, who we have personally known for many years; and if any regulation of his office does not protect them, it will be an error of *judgment* and not of *purpose*.

As to Mr. Howard, we wish to add a word or two: He was a bright boy, of eight or ten years of age, when we first knew him. His mother kept the house where we boarded when a student at college. He afterwards graduated at the same college, and came to our native county and established a classical school, and we were glad to welcome him. He determined on the *law* as his profession, and, during his school occupations, managed to find time for much reading in that direction; and afterwards studied, and perhaps graduated, in the law class of the University of Virginia. Having obtained his license, he consulted us as to a location, and the result was that he came to Richmond and entered the law-office of the Hon. James Lyons. He has been in Richmond ever since, and has had a good practice, and taken a prominent position in the Court of Appeals of the State.

 Since the writing of the foregoing note, we have received a request to publish the depositions of Dr. Taylor and Dr. Pollard, which

request we comply with—taking these depositions from Mr. Howard's printed *brief*:

OFFICE OF O. G. KEAN, *Notary*,
Richmond, September 29th, 1882.

Present: John H. Guy and John Howard, Esqs., counsel for complainants.

DEPOSITION OF DR. WM. H. TAYLOR.

W. H. Taylor, having been duly sworn, deposes and says as follows:

First question by John H. Guy, Esq. Have you been for the last ten or twelve years the State Assayer and Chemist? and did you act as Chemist for the State Department of Agriculture during the term of office of the late Commissioner of Agriculture, Dr. Thomas Pollard?

Answer, Yes.

Second by do. Were you or not by virtue of your office brought into contact with fertilizers and vendors and purchasers of fertilizers to any great extent?

Answer, I was, both by virtue of my office and by reason of my being frequently called to give testimony and make analyses in cases concerning them.

Third by do. Did you analyze fertilizers extensively for the Department of Agriculture? and what were the regulations under which the analyses were made? and what information did you acquire as to the quality of the fertilizers with which you came in contact and in reference to the methods of business of the manufacturers of fertilizers?

Answer, I have analyzed a great many fertilizers for the Department of Agriculture, and a great many at the instance of other persons. In my analyses for the Department of Agriculture, the samples submitted to me, during the first year of Dr. Pollard's term of office, were accompanied by their names, but after that time the names were withheld, the samples being accompanied only by numbers, and I was not aware of the names till the results of the analysis were handed to Dr. Pollard by me. I can recall but one instance, during my five years' connection with the Department of Agriculture, where there was reason to suspect fraud. The investigation which was instituted went "to show that it was inexperience rather than design that caused the fertilizer to be inferior." I quote Dr. Pollard's words, and agree with his view from his second annual report, page 95, where the instance is detailed. And in all this time I never saw anything in any fertilizer examined by me, the one just mentioned excepted, that indicated an intention to defraud, even if that one did. In my dealings with manufacturers of fertilizers, they have always shown themselves anxious to give their customers all that was promised. I have made for them many a costly analysis, the sole object of which was to enable them to acquit themselves fairly and squarely of this promise; and in the numerous cases before the courts, in which I have been concerned as

Chemist (not employed by the manufacturers, except one case, but by the Department of Agriculture, or by the purchaser of the fertilizer) the analysis always substantiated the chemical composition as claimed by the manufacturer, the above mentioned case still excepted. I do not assert that there are no worthless fertilizers, but I think that most of those thus stigmatized should rather be termed useless, not being suitable under the prevailing circumstances of soil, season, &c. For it is well established that the best fertilizer, theoretically, may prove the worst, practically, under certain conditions. Outside of the question of supervision, now so generally exercised over the manufacturers of fertilizers by Departments of Agriculture, it is hard to see why such manufacturers should not be as anxious to be acceptable to those whom they wish to buy their goods as manufacturers of anything else. It seems to me, taking a common sense view of the matter, that the enormous extension of the use of commercial fertilizers, from year to year, is about the strongest argument that could be advanced in favor of the general trustworthy character of these goods.

Fourth by do. How many annual reports were made by Dr. Pollard, as Commissioner of Agriculture?

Answer, Five.

Fifth by do. Were, or not, the analyses, made by you for the Department of Agriculture, stated in each of said reports?

Answer, They were stated in the reports and published with them.

Sixth by do. There happen to be two of those reports here—that for 1880, and that for 1881—please examine them and state the page on which your analyses appear?

Answer, In the report of 1880 (fourth annual), my analyses of fertilizers appear on pages 162 and 163. In the report for 1881 (the fifth annual), they appear on pages 126 and 127. There is a table of my analyses of fertilizers in each of the other three reports. I refer to all these analyses as part of my testimony.

And further this deponent saith not.

WM. H. TAYLOR.

DEPOSITION OF DR. THOMAS POLLARD.

Dr. Thomas Pollard having been duly sworn, deposes and says as follows:

First question by John H. Guy, Esq. Were you the Commissioner of Agriculture from the creating of that office to the beginning of the present year?

Answer, I was, until some time in January, 1882.

Second by do. Did the vendors of fertilizers in this State generally submit samples of their goods to you according to law and your regulations; and did you analyze many of them?

Answer, Yes.

Third by do. Do you recollect particularly that this was done in the cases of the "Star" brand of Allison & Addison, and the "Anchor" brand of the Southern Fertilizing Company; and were those brands

of manufacture sold to any extent in the State during your administration?

Answer, I answer yes to both branches of the question.

Fourth by do. Have you read the deposition of Dr. Wm. H. Taylor; and what answers would you give to the same questions?

Answer, Yes, I have read his deposition, and my replies would be substantially the same.

And further this deponent saith not.

THOS. POLLARD.

A CURIOUS PROBLEM.

Oleomargarine has come to stay, and those who consider themselves butter experts can rest assured that they have often bought it in preference to good country butter, for the manufacturers fully understand the prejudice against it, and trim their sales accordingly. It is a dangerous counterfeit, because it is so like the genuine that the two cannot be distinguished. We allude, of course, to good oleomargarine as compared with good butter, and poor oleomargarine can also hold its own with bad butter.

But the problem is not as to the virtues of either, but in the effect it bears to the law of supply and demand. Over 300,000,000 pounds of oleomargarine was thrust upon the people the past twelve months, and yet butter did not fall one cent in price, although this vast quantity directly supplid the place of so much butter in the market. Curiously, too, our supply of butter was as large as usual, and promises, owing to the rapid multiplication of creameries, to be larger, while the supply of oleomargarine will be doubled the coming year. It is a problem how butter kept its price in the face of this monster, that threatened to drive it from the markets entirely, but we may naturally conclude that it is an impossibility to overstock the markets with anything. As long as an article of consumption is for sale the buyers will call for it, and the fallacy of such a thing as overproduction should not be thought of. Our own wants are not yet supplied, and still we boast of sending thousands of cargoes abroad. Our newspapers teemed with descriptions of our exportations of beef cattle until the fact stared us in the face that we had no beef at home. Every year we sit down and wait for Liverpool syndicates to tell us what we shall charge for wheat, while at the same time we pay higher prices for flour than the English. Potatoes are coming over by the ship load, while our farmers at home are annually fearful of glutting the potato market. And pork, right in the heart of the great packing centres, is higher than in the foreign markets that are compelled to dispose of it.

With thousands of acres of land under cultivation, and broad areas at the disposal of the government, we have not yet solved the problem of providing for our own people. And that, too, with Indian corn as a crop, for Europe cannot produce corn, which gives us an advantage not possessed by any other country.—*Farmers' Magazine and Rural Guide*.

THE WHEAT CROP, AND ARE THERE ANY SUBSTITUTES FOR IT AND TOBACCO.

BY TH. POLLARD.

[For the Southern Planter.]

Mr. Editor,—I may be persistent in my views about the wheat crop, but I do not think I am extreme. A man should be *persistent* until he is convinced he is wrong. I would not give a fig for one who is not. I wish my position clearly understood—that wheat should not be generally cultivated in Virginia, but confined to the rivers and highly improved lands, and to the regular wheat lands of the State, such as Piedmont and the Valley regions. But I am not at all certain but that the apple crop would pay better than the wheat in the sections alluded to, and I believe it would, and it is passing strange that farmers here will not set out orchards. Piedmont, too, is the great grape-growing region of Virginia, and there is no question but what grapes would pay better than wheat. In Albermarle grape-growing is rapidly increasing, and the farmers are making \$100 an acre from it.

I did not intend to confine my advocacy entirely to sorghum as a substitute for wheat and tobacco, by no means. I believe, and have repeatedly stated, that the farmers in Virginia should raise more grass and stock, and try to find some substitutes for wheat and tobacco as money crops, at least until they get their lands well set in grass, and have good heads of cattle established. While much of Tidewater will not raise grass successfully, most of Middle Virginia will, and indeed much of Tidewater will also. A short time since I traveled over the country from Richmond to "Seven Pines," and was surprised to find this such a good grass country. It lays level, retains all improvement put on it, is rather stiffish, and wherever clover has been seeded the stand and growth are very good; at the "Seven Pines" is an excellent field of clover.

But my confidence in sorghum has not diminished, but rather increased recently. We had no doubt about the success of sorghum syrup, but was more doubtful about sorghum sugar. In the last number of Colman's *Rural World* (St. Louis, October 26), we find the following from Col. Colman :

"CHAMPAIGN, ILL., SUGAR WORKS.—The problem whether sugar can be made from sorghum remuneratively has been solved. It is no longer a debatable question. The Champaign, Ill., Sugar Works answer the question every day, every hour. They turn out batch after

batch of sugar from sorghum with precisely the same certainty that the Southern planter does from the ribbon cane. If any one is at all skeptical in regard to this statement, he has only to visit Champaign, Ills., to have that skepticism removed. He will see some thirty barrels of nice sugar turned out daily, fully equal to the New Orleans, selling by the barrel at the sugar works at $8\frac{1}{2}$ cents per pound. There is no sorghum flavor nor gummy character about the sugar. It will sell in any market with the New Orleans sugar, bringing the same price and giving the same satisfaction. * * * *

Hearing from so many reliable sources of the success obtained at Champaign, we visited the works last week, and found all the statements that had been made fully confirmed. Indeed, we did not expect to find the absolute and positive certainty in obtaining sugar from the juice, that we did. The miller is no surer to obtain flour when he grinds his wheat than this establishment is to obtain sugar whenever the juice is reduced. They know to a certainty just how many barrels of sugar they will obtain daily, by running their mill ten hours per day—now some thirty barrels—and the same mill could turn out about treble the quantity, if run night and day, by using more steam power. * * *

This industry will be of great national advantage. It will make our own sugar and keep our money at home, instead of sending it abroad to the amount of about one hundred millions annually. Our farmers are running too much to wheat. There is a need of some other crop to occupy their attention, the product of which can be shipped abroad, and sugar will be that product. It is not an exhaustive crop to land, like wheat, but draws its sustenance largely from the atmosphere—the ashy portion of its constituents being exceedingly light. It puts the soil in excellent condition for other crops, and, if fertilizers are to be used at all on the farm, they can on no other crop be used to so great advantage; especially the phosphates, as they not only largely increase the yield of cane, but hasten its early maturity wonderfully, and yet consume but little, leaving it in the soil for other crops. * * * *

It has only confirmed what the *Rural World* has all along claimed, and as this journal has been the only one in the world to dignify this industry with a special department, we must be allowed to tell our readers all about the success achieved, and how happy it makes us to chronicle the fact that the problem is solved—sugar, henceforth and forever, from the Northern cane, is as much a certainty as from the ribbon cane of the South."

The cost of the machinery for the above works was \$25,000, shewing that the business should be carried on by a company. We hope and believe this will make some of our farmers open their eyes, yet we are afraid that they will generally "travel on in the old ruts" for many years to come. Farmers are unused to any ventures, and have a great aversion to undertaking anything new, even to planting out apples and grapes in the region where they have been proved to be profitable. Col. McCue wrote me some time since that a lady in Nelson had, in

1880, sold 300 barrels of Pippin apples at \$4 per barrel, and had 700 barrels of other kinds to sell then.

But to some points in the editor's "Reply." I did not mean to say Mr. Ruffin did not give his land thorough cultivation, but to obviate winter killing he did not like too fine a surface, or rolling. If Mr. Ruffin was *kinky*, he made very good crops of wheat. If the editor were to visit the Valley in wheat-seeding time, he would not see very thorough cultivation for wheat—in many instances a drag run over the corn land, and then the drill, without any plowing, and sometimes broad-casting after dragging. As to the expenditure made for mules, machinery, etc., to cultivate and prepare wheat for market representing *capital* for the farmer, that is rather begging the question. If the wheat crop is unprofitable, then this is *dead* capital, and the investment had better not have been made.

The editor says: "The Doctor's argument, apparently, we may say, that because sorghum is a *gross feeder*, it is therefore an *improver*, presents a novel question in agriculture." The editor could not have read my article carefully. I said *if sorghum is an exhauster*, it cannot be a great one, as all the plant is returned to the ground by feeding, except the saccharine matter, which, being a carbo-hydrate, has scarcely any manurial value. The editor says: "It will be rather hard to say how the question stands as between the *syrup* and *grain*" (extracted from the soil by wheat). It is very easy; the former has very little value as a fertilizer, as just said, the latter being rich in nitrogen (albuminoids) and mineral elements, is a rich fertilizer. See what Col. Colman says about sorghum being an exhauster. He says, moreover, that it defies drouth, which certainly is a great thing in favor of its cultivation. Independently of its value for syrup and sugar, as a forage plant it is very valuable. If planted early here, and very easily further South two crops may be obtained from it annually.

IN manuring fruit trees the cherry should receive a lighter application than most other kinds. It is not benefitted by much stable manure, but can be top-dressed with ashes or anything containing potash, almost without stint. All stone fruits, especially those that are acid, need liberal doses of potash.

WHEN the country was new, corn ground was often sown with wheat without plowing, the stubs being partly torn down with the drag. Good wheat was then grown, but the requirements of modern reaping and binding machines demand a smoother surface than was deemed necessary in the olden time.

BOTTOM FACTS AND SOUTHERN FARMING.

BY DAN'L DENNETT.

The numerous facts given in our agricultural journals about a great variety of farm interests, how to do this and how to do that, are all very good and proper. There is but little that is new in all these. About the same facts, in other language, have been repeated scores and hundreds of times; but it is well to repeat them as often as once a year in each paper, that farmers may not forget them. They are usually well established facts, which ought to be indelibly stamped on every farmer's memory.

But what we want now, and seldom get, is facts about the best and most direct road from cotton to a complete system of mixed farming. We do not pretend to be very well acquainted with this road. In a former article we threw out some hints on the subject, but it is a great question, and requires a great deal of close observation, and thinking, and a sound judgment, and a very complete practical knowledge of agriculture to enable one to act as a sure guide to this new road. We want facts specially for the guidance of poor farmers on poor lands who want to know how to escape from the bondage that binds them to cotton. Farmers who have plenty of means can make the change whenever they wish to—farmers who are very poor can only make a complete change after years of hard struggle, hard work, close economy and careful and correct calculations.

It is doubtless best for a farmer who aims to get into mixed farming to lay out his plans for four or five years in advance, and work up to them, instead of planning only for a single year. He can only lay the foundation for the work in a year. If he is very poor, he might say that if he had a small stock of good Berkshire hogs, including two or three breeding sows, five milch cows, a good Jersey bull, fifty good scrub or half-breed sheep to a Merino buck, two good mules, a few dozen hens, ten hives of bees, a hundred bearing apple trees, the same number of peach trees, a hundred Concord and other bearing grape vines, ten Scuppernong grape vines, plum, fig and other fruit trees, and if he could be out of debt, with a pretty good house, barn and other out-houses, rich land, &c., &c., he would feel quite well satisfied with his lot. All these and much more have been made by industrious farmers in five years, starting with little or nothing. It *can* be done by thousands of poor farmers if they will take hold of the en-

terprise as a five years' job, expecting nothing more than a pretty hard living the first two or three years.

Let those talk about making fortunes at farming who choose to—the great aim and ambition of farmers who are very poor should be to own a small, well-stocked farm, a nice home, with every thing well fed and comfortable, to give the children a good industrial and a good English education, to be able to purchase a good family library, and take half a dozen good newspapers and periodicals, and owe no man anything but friendship and good will. Any farmer who can work up to such a standard of peace and prosperity in five years may have more than most people have who possess what they call fortunes.—*New Orleans Picayune*.

Pipes Made From Potatoes.

According to the *Vienna Agricultural Gazette*, it has recently been discovered that meerschaum pipes of excellent quality, susceptible of the highest polish, and even more readily colorable than the genuine *spiuma di mare*, may be made of potatoes. The familiar tuber, it seems, is well qualified to compete with the substance known to commerce as "meerschaum clay." Its latent virtues in this direction are developed by the following treatment: Having been carefully peeled and suffered extraction of its "eyes," the potato is boiled unintermitently for thirty-six hours in a mixture of sulphuric acid and water, after which it must be squeezed in a press until every drop of natural or acquired moisture is extracted from it. The residuum of this simple process is a hard block of delicate creamy white hue, every whit as suitable to the manufacture of ornamental and artistically executed pipe-heads as the finest clay. The potato, moreover, dealt with in the manner above described, promises to prove a formidable rival to the elephant's tusk. It may be converted into billiard-balls as hard, smooth and enduring as ivory, and can be depended upon for an inexhaustible supply of carved umbrella handles, chessmen and fans. As potatoes are plentiful all over the world, and likely to remain so, while elephants are, comparatively speaking, rarities, mankind at large may fairly be congratulated upon the discovery of a substitute for ivory, which can be produced in unlimited quantity, and at an almost nominal cost, taking into consideration the difference of price between a pound of the best kidney potatoes and a pound of prime elephant's tusk.

INTENSIVE FARMING.

We hear much of "Intensive Farming." By this term we understand that system which by a judicious application of manure and rotation will make the biggest crops, whilst at the same time the land is gradually improving and becoming more valuable. This is *Intense Farming*. The land is the farmer's bank on which he is to draw. If his drafts exceeds his deposits, the bank fails. If he wants his bank account to go on increasing, so as to meet readily all its drafts, he must keep an eye to his deposits. The deposits consist of high manuring—not simply the greatest quantity or the most costly artificial fertilizers, but such as are specially needed for the growing crop with the least possible outlay in money. As in every other business where competition exists, reduced cost of production is one of the main elements of success. Market prices for farm products are fixed by the general law of supply and demand. Railroad facilities quickly adjust them even between very distant points. The farmer who makes his crop at least cost, like the merchant who lays in his stock on the most favorable terms, can best sell at a profit. But the farmer who spends \$50 per acre for manure and sells the produce for \$150 per acre, is doing a better business than he who buys no manure and makes only \$50 per acre. It may be to his interest, therefore, to pay money for his manures which will return him two or three fold its cost. And this is not all the gain. Besides the annual profits on the crop, there is the annually increasing value of his lands—his capital. This system of farming, by whatever name it may be called, is the true system and the one which must ultimately be adopted by those who are to be prosperous. But the farmer must guard against the fallacy that the mere money profits from sale of crops is all that he should expect from his farm. If these profits are to go for purchasing the means of living, then he is not going forward, but standing still, with the chances of retrograding. Food, abundant food for man and beast, is to be provided. Not food only but the various comforts and luxuries which a farm can furnish and which every farmer's family should enjoy. His living is no mean item in the list of profits to be derived from a well kept farm. He has it in his power to enjoy luxuries which can scarcely be purchased elsewhere in equal purity and excellence. The orchard, dairy and vegetable garden—the poultry, hogs, sheep and all other meats, are only accessories which can be had at very little cost of money or labor.—*Charleston (S. C.) News.*

HOW ENGLISH BANK NOTES ARE MADE.

Among the things which inquisitive and energetic newspaper reporters bring to light, may be noted the following, which is credited to a reporter of the *Cleveland Herald*, Ohio:

"The Bank of England notes are the most uncounterfeitable of any securities in the world. It is a simple matter to learn their peculiarities, and once learned it is impossible to pass a counterfeit upon a man knowing these peculiarities. They are in both the paper and the plate and type printing of the note. First notice the paper! It is distinguished by its peculiar pink color. Such paper is never seen, and is made and used for no other purpose. See how thin and transparent it is! Those qualities are made specially to prevent any portion of the printing being erased by the knife or acid washing, the two specialties of American counterfeiters and forgers. Take the note in your hand! It is peculiarly tough and crisp. These qualities are brought out by the paper being made entirely from new linen and cotton, and not from rags.

"Do you see the peculiar water-mark or wire-mark, as it is called? That is produced by a special mold used when the paper is in pulp. Two notes are placed in a mold when they are in pulp and divided lengthwise. Hence the top and bottom, or long edges, are always rough. This deckie cannot be imitated by cutting. The paper is also exceedingly strong. It is said that a bank-note evenly adjusted will lift a hundred pounds weight without tearing. Do you see the difficulties a forger must overcome before he can even produce the paper on which the note is printed?

"Every process described requires the skill of an artisan, whose high remuneration keeps him from any necessity of dishonesty, and necessity makes the majority of thieves. Look at the printing? Besides the water or wire work, which is beautifully regular and intricate, a plate print is lithographed over the face of the note. Then the type printing is done. The paper is moistened first by atmospheric pressure, 30,000 double notes being dampened in an hour.

"The printing ink is also made at the Bank of England, from linseed oil and the charred husks and vines of Rhenish grapes, which produces impressions of a peculiarly velvety black, especially in the heavier figures. After printing, the notes are numbered by a machine, which, unlike a man, cannot err, and lastly are indorsed by the secretary. The bank notes are printed in type on the side of the paper that receives the water mark, and even in the event of the note being split, another of the forger's favorite tricks, the unprinted surface would only retain a slight trace of the type and water marks."

AGRICULTURAL EDUCATION.

The importance of agriculture has been recognised in all ages, by all nations; and nations have prospered in proportion to the fostering care bestowed upon it. Kings, warriors, statesmen and poets, have aided in its advancement. "The richest agricultural and horticultural contributions have come down to us from the master minds of Greece and Rome," and the most distinguished men of modern times have given it their close attention. But in the annals of history, no country will be found to owe more to agriculture, than the United States of America. The Southern and Western States especially, always have been, and are now, directly dependent on agriculture for all the elements of material prosperity. The people of these States are essentially farmers: and yet, no civilized people of this age have shown less appreciation of its pursuits, as an art, based upon the principles of science.

In palliation of this neglect, various causes might be assigned, if time and space allowed. Suffice it to say, that with Anglo-Saxon greed, spoliation and exhaustion of the virgin soil, acre by acre, have been the rule; and desertion and "Westward, Ho!" to fresh soils, the practice—a rule and practice profitable in one sense, but ruinous in every other.

Imbued with the spirit of personality of their ancestors, the Southern people have left all new and improved methods of agricultural development to the enlightened enterprise of individuals, rather than to the States; and only of late years have invoked the aid of the latter. With what success, will be shown in the course of this article.

England, France and Germany have been more or less active in promoting the art and science of agriculture during the last half century; but by different methods, which I will briefly mention.

The British Government has never had "an Agricultural Department." All advancement and improvement in the art and science of agriculture have been mainly effected through the agency of private enterprise.

The lectures of Sir Humphrey Davy on Agricultural Chemistry in 1824, following the facts made known by "the tours and writings of Arthur Young; "the surveys of Marshall and of Tuke of the Middle Counties," gave the first impetus to the efforts of educated farmers and scientific men, which was followed by great improvement in all the processes of agriculture. But it is, perhaps, to the facts made known by Liebig in Germany, and Boussingault in France, taken hold

of by the Royal Agricultural Society, with kindred associations in other parts of the realm, expounded by their chemist, and put to the test of experiment by Sir J. B. Lawes and others, that the greatest benefits are to be attributed. The scientific methods of research instituted and carried on at Rothamstead for more than forty years by Sir J. B. Lawes and his co-laborers, at his own expense, have never been equalled in practical results in any country.

It may be said, indeed, that the advancement of British agriculture owes little to the direct aid of the Government, and nearly everything to the individual enterprise of her educated farmers and scientific men.

In regard to the advancement of agriculture by means of "Technical Instruction," the Government has done very little. Under its patronage, there are only three schools devoted to agricultural education—one in England, one in Scotland and one in Ireland. The instruction given in these schools is chiefly practical. Each has one hundred or more acres of land, divided into three unequal portions: One small portion devoted to "spade culture" for the instruction of "cottage-holders;" another larger portion, cultivated with ordinary inexpensive implements and appliances, suited to rent-paying farmers; and a third larger portion for the instruction and training of large farmers. Each of these farm-schools is under the charge of a competent superintendent, with a corps of teachers, to carry out thoroughly the system adopted. The subjects taught are the usual English branches, with the theory and practice of agriculture. Judging from the character of the examinations I have seen published, the instruction in science studies must be very elementary. Besides the schools directly under the patronage of the Government, there are the Agricultural College at Cirencester and some private institutions for instruction in agriculture and its cognate branches in other parts of the Kingdom, in which science studies are taught more thoroughly. The various courses of lectures delivered by scientific men on chemistry, biology, physiology, botany and geology in the universities and societies in the cities and towns, have doubtless contributed far more to the advancement of agriculture than the technical schools under Government patronage. Then, the liberal patronage given to the support of such institutions as Kew Gardens, South Kensington Museum and others, gives indirect encouragement to agriculture, advancing, by experiment, agricultural knowledge and disseminating it among the masses.

From all accounts, the Government schools of agriculture have never been regarded as successful.

In France, agriculture, with commerce and public works, is made a branch of the Government—with a Cabinet officer, known as Minister of Agriculture, Commerce, &c.

The range of this department extends to all the various branches of rural economy, as well as to agricultural education, model farms, the improvement of the breeds of cattle, sheep and horses, and systems of experimentation. The department, as organized, receives about \$20,000,000 annually, of which \$2,500,000 is appropriated solely to agriculture. For this large expenditure, in comparison with that of other countries, the return in productive and agricultural wealth exceeds that of any other, which accounts for the wonderful recuperative powers of the French people. In the sugar beet and silk culture alone, the methods pursued indicate clearly the importance of science as the basis of successful practice. Of the Latin races, the French excel in all the arts of life, and technical education and rural economy, based on scientific instruction, occupy a distinguished place in the estimation of the people.

In the Empire of Germany no National Department of Agriculture exists. Each Kingdom has been left to establish its own system to suit the varied wants and adaptations of its people.

In the Kingdom of Prussia, agriculture is made a co-ordinate branch of the Government. The whole system of agriculture and of agricultural instructions is organized and co-ordinated with "graded schools," experimental farms and stations in various parts of the Kingdom, and regulated under a discipline almost as concise and rigid as that of the military. The results of this system are shown in the rapid advance of Prussia from a second- to a first-class power, in Europe, in all the elements of material prosperity and the many benefits that have accrued to science from the accurate methods of research in use.

It has been truthfully said, "that any system of education designed for the whole people must embrace many different grades; *that we must not expect too much from the higher institutions alone.*"

Having sought diligently for the best example of a system of graded education, I find in the Kingdom of Bavaria the interests of agriculture best subserved in this particular—a system so graded as to lead from the *lower or practical agricultural up to the higher or scientific* "*pari passu*" with an ordinary education.

A brief mention of this system may furnish us some useful hints for our future guidance.

Commencing at an early age with Kindergarten, or object teaching, the child's love for natural objects is cultivated. At the age of seven

years, compulsory education begins, with daily attendance during ten months, for seven years, at the common schools [Volksschulen] in which instruction is given, along with other studies, in garden and orchard culture as a regular part of the course—a piece of ground for a garden and orchard being provided as a part of the outfit. Practical lessons are given regularly, and the boys are required to take an active part in the lessons. Directors and superintendents are required to see that this department of teaching receives due care. The teachers doing this work are qualified for it by a five years' course of previous normal instruction. But even with this rigidly enforced system of compulsory attendance of seven years, it is admitted, by those in authority, that the results have fallen far short of the anticipation. At the end of the seven years and the attainment of the fourteenth, the boy may have to go to a trade or to work on a *farma*. But even then provision is made for him, so that he may spend a part of his Sundays and week-day evenings in several kinds of schools, according to his special wants, and be taught from two to eight hours a week. These schools are known by the name of *Fortbildungsschulen*, or higher graded schools, and attendance on them is also made compulsory for two or three years after leaving the common schools, or *Volksschulen*.

In addition to these there are "*winter schools*," for farmers' sons, carried on by different *Agricultural Societies*, from November to February. In these, besides "the common school branches, instruction is given in the natural sciences, field-culture, the raising of animals, book-keeping, farm management; and where it is possible, drawing, field-measurements, drainage, soils and fruit culture." The fees for tuition in these winter schools are not high, and "the necessary living expenses are made as low as possible, that none may be excluded on account of want of means." The Government furnishes the teachers in the public schools salaries, buildings, fuel and incidental expenses, and the schools with wall-charts, collections of minerals, soils, agricultural products, models of machinery, of tools, of flowers, chemical and physical apparatus, and various other means of instruction.

The next class in the series is the "Field Culture School" [*Ackerbauusschulen*], in which the course of instruction extends through two or three years, and practical farm work is made a part of the course. The instruction imparted is very similar to that of the winter schools carried on by the *Agricultural Societies*, and is so far of an elementary character, that those who have passed through the "peoples' schools" are capable of understanding it.

At *Lichtenhof* is located the "*Middle Agricultural School*," in which

there is a higher course of studies than in any of the preceding, extending through three years, where theoretical studies can be pursued more thoroughly; but practical farm work also forms a part of the instruction. In all the Middle Schools, the pupil who completes the course in agriculture is required to serve only one year, instead of three, in the army; and this is a great incentive to young men to enter these schools.

Before speaking of the "*Higher Agricultural Education*," I will mention the special courses of instruction connected with the various schools described, or provided, separately: "Of the pupils in these, one devotes himself to sheep, another to cattle and the dairy, another to fruit culture, each seeking to learn what especially concerns his own business." These special courses for shepherds, stock-farmers, &c., generally occupy but a short time—scarcely more than a few weeks in the year. "Cheese-making, brewing, drainage, irrigation and horse-shoeing" are likewise represented in the circle of special agricultural courses given at certain fixed places.

The "Higher Agricultural Education" is imparted at the "Central School" at Weihenstephan, and in the Agricultural Department of the Polytechnic Institution at Munich. The Central School far excels those already mentioned, and the instruction is well adapted to young men who have been well trained by previous study and work. "The course of study comprises two years, and consists of theoretical and laboratory instruction. When the pupils enter, they must not only have a solid groundwork of mathematics, but the faculties must have been well developed by the study of languages, history and drawing, so that they can understand the lectures given by the professors, and be able to digest them.

The other advanced agricultural school, as stated, is the Agricultural Department in the Polytechnic Institution in the city of Munich, which has also an experimental station in connection with it, with sufficient ground for experiments on soils and animals. The requirements for admission include two years more of book studies than the entrance at Weihenstephan; but no practical acquaintance with farm-work is deemed necessary. The design is to educate young men in those sciences which underlie agriculture, rather than practical farmers, or managers of large estates. The chemical laboratory for this department is fitted up with the best appointments, and nothing is wanting for the theoretical side of agricultural science. On the outskirts of Munich there is also a Veterinary School, which has a three years' curriculum course of study.

At Aschaffenburg there is also a *School of Forestry*, which is regarded as holding equal rank with the Polytechnic School or the University; and the feature which marks its dignity is, that no one can be admitted except those who have completed a course of study in a "gymnasium" or "real gymnasium."

It will be noticed, now, that in the Kindergarten, the People's Schools, and the Fortbildungsschuler, *instruction in agriculture is given, but it is made subordinate to the main object of developing the mind of the boy, and giving him a general education.* It will also be noticed that a boy who has attended the "People's Schools" may pass through the Gewerbeschulen, or higher graded school, into the course of practical, higher education afforded by the "*Central Agricultural School*"; while classical training is required of those who wish to pursue the more theoretical course in the Polytechnic School, or to enter the State service as "Directors of the Forests."

Having briefly mentioned these systems of agricultural education, it is not my intention to discuss their merits or to pass judgment on them. They have been brought forward simply to indicate the character of the organizations different nations have considered best adapted to the social and political conditions of their people. How far these systems, or any part of them, may be adapted to the wants of our people, is a question to be decided by the experience of the great body of teachers in our country.

Prior to the passage of the "Morrill Bill," known as the "*National Land-grant*," in 1862, agricultural teaching, technically, had been started only in two States, viz: New York and Michigan, and in both with very unpromising results.

The National Land-grant Bill awarded to each State in the Union — acres of public land, the proceeds of the sales of which have to be invested and the interest used for the education of the people. The words of the bill prescribe the establishment of "Colleges, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

In 1875, the United States Commissioners of Education reported that forty-three schools in thirty-four States had been established on the Land-grant Funds, in thirty-four of which the claims of agriculture were recognized.

In a recent address on the subject of foreign systems of agricultural education by Prof. R. B. Warder [to which I am largely indebted for information on the subject], he says, in regard to our systems: "The plan of organization, the equipment and the internal features of no two of these schools are the same; the widest differences may be observed in the standard for admission, the course or courses of study, the solution of the manual labor question, the discipline of the students, and the facilities for practical and theoretical studies. It is a pleasure to believe that well qualified professors are earnestly engaged in imparting thorough, scientific and practical education; yet it must be admitted that those who strove to inaugurate this new era of industrial education, have not yet realized their fond anticipations. In the first place, the few central schools we have for farmers, fail to reach the masses. Many who could attend them, think the way is too hard. The fact that tuition is free, is comparatively a small matter when a young man's labor is needed at home, or when he must be earning his own living instead of paying his board near a city. Even when farmers' institutes or lectures are held for a few weeks of the winter, it often happens that those for whose benefit they are intended, show very little interest. Similar discouragements prevail in Bavaria, but strenuous efforts are made to overcome the habitual indifference of the farming classes."

That the foregoing statement is not the least exaggerated, is well-known to all who have paid any attention to the subject. In the cases where the Land-grant Funds have been given to universities and colleges already established, the results, as to numbers in attendance, have been still worse. With the same drawbacks to contend with as the agricultural colleges *proper*, the universities and established colleges have had the additional drawback of unsuitably prepared students for the courses of instruction afforded in agricultural chemistry and the various other branches upon which the study of scientific agriculture is based. This want of preparation has been a grievous burden, even to the agricultural colleges proper, and has rendered a majority of them utterly useless as technical schools, in any sense, *in the time allowed to the student*. This want of preparation on the part of young men who attend agricultural and other technical schools, may be regarded as the "missing link" in our system which the French and German methods supply in their graded courses. How this want can best be supplied in our country, the wisdom of this, and of kindred associations, must aid in determining. To those interested in the future of American agriculture, no subject is more important.

The agricultural colleges in the several States, although existing a

period scarcely longer than that allotted as probation to a teething child, with organizations scarcely more vigorous or mature, have received from all quarters the severest animadversions and criticisms; and, in many cases, the teachers have received the most abusive treatment at the hands of those from whom it was meet and right that they should receive every aid and comfort. So far from sustaining and strengthening the arms of the men engaged in this work, those most interested in it have been foremost in heaping upon them detraction and obloquy.

It will be admitted that any rational system of agricultural education must rest upon a surer foundation than the mere practical knowledge possessed by the individual who proposes to make agriculture a profession. This proposition will be accepted in the main by most persons, but the difficulty with the farmer seems to be as to "*how, when, and where*" the *practical* is to be combined with the scientific. Ardent advocates are to be found on all sides of this triangular question. Such being the case, it will be well for us to review briefly the methods pursued in the most prominent agricultural schools, established wholly or in part on the United States Land-grant.

The oldest institution of this kind, and the only one which claims to be successful, is the Michigan Agricultural College at Lansing. Prof. Beale, of this institution, in an address delivered before the Connecticut Board of Agriculture during the past year, in answer to direct questions said: "In twenty-three years we have had 212 graduates; of these 13 are professors in other institutions, 86 are farmers, and the remainder have taken up the various avocations of life." In answer to a question in regard to the organization and career of the college, he said: "For many years the college languished with very few students, until the sympathy of the Grangers was enlisted. With their co-operation in the State Legislature, and the State Board of Agriculture, we were enabled not only to obtain the necessary appropriations from the Legislature, but to popularize the institution with the farmers, most of whom were members of the Grange. When I went there ten years ago it was very unpopular. The newspapers were fighting it throughout the State. We had to fight for any appropriation by the Legislature. The most influential papers are all in favor of us now. This change has been brought about largely, too, by the Farmers' Institutes, and by the fact that the right men have been at the head of the Granges in the State. The Master of our State Granges, and all the officers, are strongly in favor of the Agricultural College. They work for it in every way. If a member of the Legislature is not favorable to it, they go for him, so

that he does not go to the Legislature a second time. They leave him at home and put another man in his place." In answer to the question, "How they manage students at manual labor," he said: "The management of students' labor is very perplexing. For perfect success, it requires a *foreman* of unbounded tact and an unlimited amount of patience." In answer to a question concerning the advantages derived from manual labor, he said: "On the farm there is need of more brain work and less of the hands. At all times brain work pays the best returns for the time given to it. Labor with the hands is easier than work with the head. If a greater portion of farmers were well educated, people would consider farming a higher business. Any occupation takes rank according to the culture of those who engage in it."

These were the expressions of a Professor in the Agricultural College admitted to be the only successful one in the United States and they are very significant.

On the other hand, in the convention of delegates from the agricultural colleges and societies of the various States, called by the Commissioner of Agriculture in January last, in Washington city, when this subject was under discussion, a gentleman [Dr. Gregory] for many years a member of the Board of Managers of the Michigan Agricultural College, and subsequently connected officially with the Illinois University, said publicly, in my hearing, in substance, that such a thing as a scientific education proper could not be obtained in that college; that a majority of the students were induced to go there because they fared better and the work was lighter than it was at home; that most of them were too poorly prepared to profit by scientific instruction, and those who passed through the course did so by the dint of the most persistent "coaching." How far this assertion is sustained by the facts, I have no means of knowing.

Having carefully examined the catalogues of a large majority of the agricultural colleges founded on the United States Land Grant funds, I find, with a few exceptions, that all teach agriculture, the mechanic arts and military tactics in the course of a regular curriculum of studies, covering a period of from two to four years. In the agricultural colleges founded on the United States Land Grant solely, there is no such thing as an elective system of studies allowed; all who enter must study agriculture.

In the address already quoted, Prof. Beale describes the methods of these different institutions so graphically, that I shall use his words. He says: "These institutions are located in thirty-seven States. Each college differs in some respects from every other. Some of them pos-

sess and till large farms, performing much work with the aid of the students. Some possess no farms. Some till the farms entirely by hired labor, without the aid of students, and try to make money by the operation. To run a farm for profit is one great point made by some colleges. Some colleges are connected as branches or departments of a university. Others are distinct. Some have only an agricultural department and military training. Some a mechanical department. There are various plans for students to work. At some colleges students all work at one time a day; in others, at different hours. In some the students all work every day throughout the course. Some require very little work of the students, and during only a part of the course; others as much as three hours daily. In some of the colleges the students are taught telegraphing, engraving, printing, designing; and the girls are taught the art of cooking and washing. In some institutions the students are paid for all their work; in others for part; or all of the work is for practice and instruction, without remuneration. We have agricultural colleges with 'terms' extending through the coolest part of the year; others in which the terms extend through the warmest part of the year, with a long winter vacation, in which students can engage in teaching school. We have colleges in warm States and in cold States. In States where agriculture is the prevailing industry, and in States where manufacturing is the chief occupation. Most of these colleges are proceeding without a model. All are striving to pursue the best way, so far as their means will permit. In time errors will be eliminated and the best courses will be learned. In due course of time we shall have somewhere a model agricultural college, and probably more than one, while others will dwindle, go down, or continue to pursue a course not very different from other colleges with purely literary and scientific courses. The practice of uniting an agricultural college with an established university, has been abandoned in Mississippi, Texas, and the Ontario College in Canada. The officers in charge of these institutions, after a trial of a few years, reported that one word, '*failure*,' gave the history of all such arrangements. They said that agriculture was overshadowed by other studies, and that farming was elbowed out by the other professions. But what shall constitute success in an agricultural college? This is a question very difficult to decide. Each may be successful in some respects and not in others. Persons differ in opinions as to what an agricultural college ought to attempt. Some think that a college is more or less successful according to the extent and quality of the training given to its students. Others to the popularity with the class of people who support it—to

draw large numbers of students and to retain a large proportion until they complete the curriculum. In this connection, however, other things have to be considered. If agriculture is depressed from any cause, and the outlook for farmers is discouraging, young men will seek other business, no matter what has been their training. If agriculture is booming, some will study and probably make farming a life work. Some of the students attend the Michigan Agricultural College because they consider the opportunities excellent for getting a good education, although from the start they expect to become lawyers or doctors, or engage in other business. Others attend for various reasons of more or less importance."

This lengthy quotation has been made from Prof. Beale's address because it is the expression of an experience co-eval with the establishment of agricultural instruction in this country, by one eminently qualified to speak most advisedly on the subject.

This account, however, relates chiefly to the Agricultural College proper. Let us now review, briefly, the career of those which have been established on the University plan, or have been grafted on universities and colleges already established.

Under the former head, we have Cornell University, near Ithaca, New York. With the United States Land-grant Fund, and a large endowment from Mr. Cornell, this institution is one of the most thoroughly equipped in this country. It is organized with departments of classical, scientific, philosophic and literary courses of study; with technical courses of agriculture, chemistry, physics, civil engineering and natural history. By the act of its incorporation, and by the acts of the State legislature, they admit State students from each assembly district every year, and continue each of these scholarships through a course of four years' curriculum. This makes the number of students in the State, on whom the University agrees to bestow its highest privileges, free of tuition, five hundred and twelve, or four for each of the assembly districts. The successful candidate may enter any department or course of study in the University for which he is prepared. The scholars are mostly selected, by yearly competitive examinations, from the various public schools and academies maintained by the people of New York. With this grand inducement, the number of young men studying agriculture is—in the senior class, 5; junior, 11; sophomore, 12; freshman, 7; total number, 35—in a total number of 463 attending the Institution. (See Catalogue for 1879-'80, page 32.)

The Illinois Industrial University, an institution of the same character, largely endowed in addition to the Land-grant Fund, having every

equipment for the study of agriculture and horticulture, with tuition free, has only ten students of agriculture, in a total of 416 in the Institution. This Institution has, for the illustration of practical agriculture, a stock farm of five hundred acres, with barns, stables, pen-yards with the finest specimens of improved breeds of cattle, swine and sheep; as well as one hundred and eighty acres in the highest state of cultivation as an experimental farm. Everything seems to have been done to attract students to the study of agriculture, with the result stated.

The same is true in regard to Purdue University, at Lafayette, Indiana, with the United States Land-grant and very large endowments besides. Out of a total number of 300 students, they have only two in agriculture. (See Catalogue for 1880-'81.)

In the agricultural department of Harvard University, the largest number they ever have had, is seven.

In the Thirteenth Annual Report of the Sheffield School of Yale College, is the following statement, which explains fully the conditions there: "We beg leave again to state, as we took occasion to do in our last report—and we repeat it now for the purpose of giving still more publicity to the fact, and of keeping it constantly alive in the public mind—that there are no less than thirty scholarships in this school that are to be had by any poor and deserving applicant for the mere asking." And yet, the numbers studying agriculture in the Sheffield School are notoriously few, notwithstanding the thoroughness of the instruction and the great reputation of Professor Johnson and his able colleagues.

The School and Department of Agriculture of the University of Virginia has never received any portion of the United States Land-grant Funds. It was fully organized in 1873, being founded on the deed of gift of one hundred thousand dollars from the late Samuel Miller, of Lynchburg, Va., placed in the hands of a board of trustees, whose duty it is to take charge of the fund, and to see that the interest is used in the University to carry out the objects specified in the deed.

While the peculiar nature of the organization of the University of Virginia—with its separate schools, elective system of studies and very high standard—renders any comparison with other institutions with curriculum courses unfair, we do not shrink from it, even with the more richly endowed and thoroughly equipped universities we have mentioned.

In the School of Agriculture, Zoology and Botany of the University of Virginia, there have been 40 students, 13 graduates in the *School*, and 5 in the *Department* of Agriculture. In this, as in all the departments

of the University of Virginia, the "elective system" obtains—i. e., entire freedom of choice is left to the student, as to the schools he shall attend, and the order in which he shall attend them. The studies comprised in this department are taught in the Schools of Agriculture, Zoology and Botany; Natural Philosophy, General and Industrial Chemistry, Analytical and Agricultural Chemistry, Mineralogy and Geology, and Applied Mathematics. The order in which these schools are taken is left to the student, who is generally influenced by the nature and extent of his previous preparation, as well as by his ulterior aim. The Degree of Bachelor of Scientific Agriculture is conferred on such students as have obtained a "Certificate of Proficiency" in the class of physics in the school of natural philosophy; "Distinctions" in junior applied mathematics, analytical and agricultural chemistry; and "Diplomas" in the schools of general and industrial chemistry, agriculture, zoology and botany, and mineralogy and geology. In the organization of the School and Department of Agriculture in the University of Virginia, the same principles have been adopted, the same methods of instruction pursued, and the same rules applied as obtain in all the other schools and departments of the Institution.

Acting upon the idea that agriculture is the most comprehensive of all professions, having its foundation deeply laid in the principles of natural science, the authorities of the University have wisely put the school and department of agriculture on the same footing with the schools and departments of medicine, law and engineering, and provided every facility for the instruction of those who enter it.

It is well known, that the object of the authorities of the University of Virginia, from the days of its "father"—Thomas Jefferson—to the present time, has been thoroughness of instruction in all of its schools and departments, regardless of the numbers who may attend. The academic, medical, law and engineering departments are regarded as unrivaled for thoroughness of instruction in this country, and the graduates of these departments take the foremost rank in their respective avocations wherever they go. That the school and department of agriculture should be an exception, even in numbers, will be fully explained further on in this article.

In the brief review given of the systems pursued in the agricultural colleges *proper*, as well as the universities with agricultural departments, we have seen that some among the former class have attracted a reasonable number of students, while others have been less fortunate. But it will be noticed, also, that where the numbers are found, they have been attracted by methods based chiefly on favorable, social and

political conditions, rather than on any excellence of the system of instruction. It appears, furthermore, that all of these systems and methods have been absolutely theoretical and tentative, without foundation in experience. In fact, many of them may be regarded as essentially "empirical," without any claim to be compared with systems of education, resting upon the tripod of experience, reason and attainment. Such a system, we claim, the University of Virginia has attained. With what success in the school of agriculture, time will show.

It is evident, however, that on this subject there is nothing like an uniformity of opinion among the great body of instructors and others interested. This is shown in the different way the courses of instruction are divided in the several schools. One advocates a short term; another a long term; one a four-year curriculum, with compulsory agricultural studies; another a two-years' course, with agriculture optional for a part of the time. Each advocate of a particular system, if he has obtained "*numbers*," no matter how he has gotten them, triumphantly points to *them* as proof of perfection, regardless of real attainment. Under these circumstances, the question very naturally arises, Is success in agricultural education, in any true sense, to be found anywhere in this country? Is it scientific attainment, or practical knowledge, or practical training without scientific attainment, that produces the best results? How is it, that so many honest men advocate systems and methods so different? How shall we reach the truth of the matter? Can all these methods be equally correct and applicable to every condition? While truth is absolute and unique, may not circumstances alter cases? Can it be advisable to submit all the agricultural institutions of the country to the same methods? It is a wise exercise of common sense to infer that certain adaptations must exist in relation to, and have more or less influence on, the success and usefulness of any given institution. As previously indicated, there is a prevalent notion among farmers that practical knowledge is the matter of greatest importance. But if it can be shown that scientific knowledge is not injurious, but is essential in all the details of the art of agriculture; that it adds skill to practice, and is fully recognized in all other industrial arts, as well as the learned professions, surely such a demonstration would establish the fact, that scientific instruction is not only necessary but should be made the most prominent factor in any scheme for the "higher agricultural education." This does not exclude the idea of the importance of practical knowledge, and training too, however previously obtained, whether on the farm, as in this country, or in the "common and central schools" in the graded system of Bavaria.

The question very naturally arises as to the extent and amount of practical knowledge necessary for the farm-raised youth in this country, otherwise prepared, to enter the science schools in a university. The average farm-raised boy in the Southern and Western States is generally very familiar with the natural phenomena and all the incidents of practical importance which occur on the farm. If he does not pry into "the why and the wherefore" at the time, the facts are impressed upon his mind so firmly, that in after life he is able to recall them and to trace effects to their causes. If this be true, what I have spoken of as the "missing link in our system" is, to some extent, supplied in place of the Bavarian graded-schools. The observant traveller, or sojourner, amongst the country people of Continental Europe can scarcely have failed to observe the clumsy gait, the cumbrous garb, the head and foot gear, entailed upon the young as well as the old, for centuries, by which the physical, not less than the mental, activities seem to have been enervated and repressed. In what striking contrast with this is the entire freedom of life and limb given to the American boy? I repeat, then, that a large majority of boys reared on farms in this country are familiar with all the ordinary processes of farm-work, the management of stock and the use of implements and tools. They may not have attained an accurate knowledge of all these processes, or very great skill in the use of the implements and tools, nor do we regard this as essential in this stage of the educational process. When young men, reared under these conditions, are brought face to face with the scientific principles upon which these familiar processes and phenomena are based, they readily perceive their bearing, seize hold of them, and are ever afterwards able to apply them. In this way they soon become intelligent interpreters and skilled co-workers with Nature in all of her operations. The idea that a young man who has been raised in the country, or on a farm, should be required to plow, to ditch, to mow and to attend to stock for a large proportion of his time in an agricultural college, or agricultural department in a university, in order to learn the relations between science and skilful agricultural practice, is, to my mind, time thrown away. That may be the best way to make skilled laborers, and may be time well bestowed in schools of a lower grade, but it is not the way to elevate agriculture to a higher *plane* or impart a just knowledge of the scientific principles on which its successful practice is based.

To the question, so often asked, how, when and where should this practical knowledge be obtained in our system, my answer is, In their own homes, until we can organize some system like that already stated

to exist in Bavaria. Farmers who wish their children to have tastes for country life and their sons to be farmers, should not only do all to make their homes pleasant and attractive, but should begin with them as early as possible in the household and on the farm, not as a task, but as *helpers* in all the work going on whenever the time can be taken from study and legitimate sport. The observation and perception of children at this early age, in regard to all the natural phenomena going on around them, is keener than ever afterwards during their lives. What they see and observe then they never forget. Instruction of this kind is very similar to that of the Kindergarten and early common schools in Bavaria. Boys and girls submitted to instruction of this kind, even casually, learn a great deal up to the time they are nine or ten years old. More carefully imparted, it will prove of great importance when they enter the schools and departments for the higher scientific education.

Who has not observed the large proportion of time idly spent by the children—white and black—who attend our common schools, and has not realized the necessity for some useful and instructive occupation to prevent the “mischiefs that Satan finds for idle hands to do?” The fact that the ages of those attending our common schools range from seven to twenty-one years, makes it all the more important that some instructive occupation should be provided in place of excessive baseball and nomadic wanderings in search of “forbidden fruit.”

How far any improvement of this kind can be made in our system, your experience and maturer judgment is better able to determine. The evil is apparent. Idleness, for too large a portion of the time, is the cause. As long as the cause remains, the evil will increase in enhanced proportion. The only remedy is the provision of some wholesome, useful and instructive occupation during the idle time of school-days and Saturdays, by which the pupils may be beneficially trained in useful labor as well as in reading and writing and cyphering. I am fully convinced that those who enter our common schools should be taught to work as well as read. To a large majority, the education of the hand will be more useful than the head. But, on the other hand, the question may be asked, Is it absolutely necessary that a practical knowledge of agriculture should be obtained before it is studied as a science? This is not the case in the study of other professions. It is not considered necessary that a student should have a practical knowledge of medicine or law before he studies these professions. A graduate of medicine in the University of Virginia and other institutions generally recognizes the want of practical knowledge after leaving

college; and, to satisfy it, enters the wards of a hospital, or forms an alliance with an old practitioner in the country or town, who is often glad to have him on account of his new and more scientific methods of investigation. The graduate of law either goes into the office of an experienced lawyer for a time, or bestows an equal amount of time to attendance on courts, the perusal of the records and the investigation of special cases. Is there any reason why the student of agriculture should not pursue a similar course? But, admitting that previous practical knowledge *is important* in the study of agriculture, it must be conceded that the advantage in this respect is greatly in favor of the farm-raised boy who enters the school, otherwise prepared, to profit by the instruction.

Again, the assertion is often made that agricultural education should be made *special*. Why more special than any other profession or occupation which rests upon such a broad basis of the physical, chemical and physiological sciences? The suggestion never seems to have occurred to this class of people that, like other things, it may be made entirely too special, even in the four-year compulsory curriculum courses of study in the best equipped institutions in the Northern States. The danger is that this special education may be carried too far, and that the risk is incurred of turning out a set of "*empirics*"—a class of men well characterized "as wanting in the four dimensions necessary to make a full and complete man" in agriculture, or in anything else.

Do the universities and colleges, with agricultural schools and departments, founded upon the United States Land-grant Funds and other endowments, furnish any model or improvement upon the system pursued in the University of Virginia? In my judgment they do not. The principles of organization and the methods of instruction laid down by the illustrious founder of the University of Virginia for the academic and other schools and departments, are equally applicable to the school and department of agriculture in all respects; and the system of instruction is like that of all the other schools in the institution, in which the student is brought under the teaching of instructors who, by precept and example, impress upon the mind the scientific principles on which the profitable practice of the art is based. This is the only course likely to inspire the student with a true sense of the importance of agriculture as a profession. The organization and methods pursued in the University have stood the test of nearly three-fourths of a century, and have found so great favor in the eyes of the officers of various institutions in our country, that they have adopted them. For

these and other important reasons, I submit, that it is wiser and better that the school and department of agriculture should follow in the path of safe precedent and the light of experience in the conduct of the other schools than enter upon a new and untried system.

This subject, of combining "the practical and the scientific" in agricultural education, has occupied the attention of the most experienced educators in the country. President E. E. White, formerly a professor in the Michigan Agricultural College, and now at the head of Perdue or Indiana University, in a recent address on this subject before the State Board of Agriculture, says: "To what extent can an agricultural college give its students actual practice in farming? A few students may be provided with sufficient practice to increase their skill, but I confess that I do not believe that they can be provided with adequate practice on a farm of 150 acres. It takes time to learn any art, and farming is one of the arts that cannot be acquired in a few lessons. It takes years of practice to learn how to run a farm successfully, and this practice cannot well be provided in a college course. I have little respect for the wisdom of the farmer who will send a boy to an agricultural college to learn how to mow, to plow or to sow. The college can give a most valuable course of instruction in agriculture. It can not only teach the sciences closely related to agriculture, but it can impart a knowledge of principles and processes, and give illustrations of their skilful application and uses. It can also afford some practice; but a well-conducted farm is, in my judgment, the place to learn practically the art of farming—to acquire the manual skill, and to learn its details as a business. Much is said of the importance of teaching students the art of conducting experiments in agriculture. Experiment should have a prominent place in agricultural instruction, but it should be remembered that experiment should be taught as a means of investigation. Experimental farming, and practical business farming, are different processes. Experiment, like experience, is a dear school; and experimental farming is not an exception. Experimental farming should be taught for the distinct purpose of investigation, and the student should realize the difference between investigation and a business operation. Moreover, thorough scientific training is the necessary preparation for experimenting in agriculture. The student should be taught that experiments at one place are of little value to reach the best results; they should be conducted in more than one locality. I am here to give no countenance to the pretension that an agricultural college can take boys, and in from two to four years turn them out practical farmers, able to manage a farm successfully; but I do claim,

in examining the many labor-saving implements which ingenious mechanics are continually inventing and improving, in addition to seeing the fine specimens of improved stock. No farmer can be successful unless he adapts himself to the present condition, economizing labor by using improved machinery, improving the soil, reducing the area of cultivation, making crop yields far greater from a smaller surface, and a thousand blades of grass grow where one grew before. The State Agricultural Society, if wisely managed, may become a great adjunct in advancing and building up our depressed and prostrate agricultural interest, which is the main basis of prosperity, and especially so to a people having so few manufactories as we have.

In selecting executive officers, none should be appointed but the most sensible, solid, practical men, of incorruptible integrity, who keep fully abreast of the times in perusing the leading agricultural journals, steering clear of adventurers and doubtful characters, who are bankrupt in every sense of the term, and especially of that pestiferous class who are ready to go with any party or obey the order of any corrupt, unprincipled boss who will promise them a chance for a good resting-place, avoiding also another class whose sole end and aim is to use the Society as a machine to carry out their selfish and sinister designs and purposes, the result of which would soon take the Society down to its lowest ebb.

I am grieved to think of the poverty of the mass of our farmers, but few being so fortunate as to have any money after paying their necessary expenses, taxes, etc., and to enable as many of them as possible to come together, our railroads should not charge more than one-fourth of their usual rates, and the hotels and boarding-houses very low rates. The greatly increased numbers desiring accommodation would compensate them amply.

J. R. W."

Second. A short extract from the *Gordonsville Gazette*. We say *short*, because of the length of the article from which our extract is made:

"But I am getting off the track. Our section came out in a new line at this Fair. Not only did John Reedy take five first premiums with his horses, and Dr. Reid one, but Mr. Moore, of Liberty Mills, carried off valuable stakes with a neat little racer he rode. Ficklin, Doswell, and other noted horsemen were astonished at this departure, as well they might be. I took a good look at Ficklin's new \$1,700 Percheron, "Victor," but don't like him quite as well as old "Colonel." Still I'm not a judge, and he is a good, quick, heavy-draft horse.

In poultry, friend Bradbury proved that Orange could raise as fine chickens as sheep and hogs.

Thousands of people visited the Fair daily, and I think that the *Gazette Farm and Live Stock Circular* must have been read and commented upon by at least ten thousand people. Several prominent gentlemen spoke in very favorable terms of the enterprise, and I think we may all reasonably expect some good results from it.

The display of machinery was marvellous, but what pleased me most

were the daily races run by the traction engines, which had far more at-traction for me than the best running or trotting match.

The side-shows were very numerous, there being a mermaid, a living, eating chicken, without a head [like Mountcastle's Herodian Mystery], and many other monstrosities. But the chief attraction was an entertainment given by a band of foreign gypsies with seven large bears and two baboons, who performed in a tent on the grounds and had their encampment outside. Part of this band passed through Gordonsville a few weeks ago.

Of course the ladies were greatly interested in the V. M. I. Cadets, who had their tents on the ground and went through their drill every day. Friday the First Regiment joined them in a grand review before Governor Cameron and other notables. It was truly a beautiful sight, and I wished that our boys had been able to take part. I passed many pleasant hours with the Hamiltons in their hospitable tent, where a host of stock-men would congregate to listen to the Augusta twins [Bowman and Pratt] cracking jokes with the Judge and Maxon. These reunions are glorious, and lead one to think that for geniality and fraternal kindness these stock-men take the lead. Good luck to all of them.

Before closing my notes upon this, the most successful Fair Richmond ever held, it is but right to say that but for the energy, the courage and devotion of Gen. Wickham, the State Agricultural Society would be an institution of the past. The General was called upon in the Society's darkest hour, when hope seemed dead, and by his individual exertions he so stirred up the press and the people as to make this exhibition an overwhelming and glorious success. For this the General deserves the unbounded thanks and gratitude of the whole State. He has done more for the farming community in one single year than politicians have in ten. He has done his duty well, and we of this section do but unite with hundreds of others when we thus publicly thank him for his untiring efforts. WHARF RAT."

We have only to add our opinion as to the effect of the *Trades' Parade* on the Fair. As managed it did the Fair no good, but injured it. It was, all admit, a *grand display* of the business interests of Richmond; but occurring, as it did, on the day before the Fair, when all the business houses and factories were closed, it brought out the whole population of the city to their windows and the most favorable positions on the streets. The Fair was thus denied a similar closing of business on Thursday, which we may term the *city day*, and thus the *State Fair* was only *secondary* in the great display.

Now we have reason to know that it was not the purpose of the managers of the Trades' Parade to ignore the Fair, but to help it. The mistake was, to make it an exclusive *city display*, and to forget the fact that the people of the State wish no impediments to the best attendance at their Fair, and that the city people should unite, in a practical way,

with the Agricultural Society, to show on its grounds all the great industries of the State, from the smallest farm, factory and village, to the capital city itself.

THE VIRGINIA COUNTRY SQUIRE OF THE COLONIAL PERIOD.—Apart from politics, these country squires found but little business wherewith to occupy their time. The correct supervision of the slaves was ordinarily intrusted to overseers, and the masters were thus secured in the enjoyment of ample leisure, which men of noble ambition, such as Jefferson and Madison, could turn to good profit in cultivating their minds. But to men of more common mould this ample leisure became monotonous, and in such a society as that here depicted, with no town life, no roads or inns worth speaking of, and no amusements save horse racing, the entertainment of guests by the month together was regarded both as a duty and as a privilege. Every planter kept open house, and provided for his visitors with unstinted hand. The style of living was extremely generous, and often splendid. The houses were spacious and solidly built, sometimes of brick or stone, but more often of wood. Panelled wainscots of oak and carved oaken chimney-pieces were common, and the rooms were furnished with the handsomest chairs and tables and cabinets that could be brought over from England. The dress, too, of both men and women was rich and costly, and the latest London fashions were carefully followed. Silver plate, elegant china, and choice wines were commonly to be found at these great manor-houses, and the stables were stocked with horses of the finest breed.—JOHN FISKE, in *Harper's Magazine* for November.

IT MAY not be generally known that the Duke of Athole is one of the most extensive tree planters in the world. There are already vast woods and plantations in Athole and Dunkeld, Scotland, and, as of course they exist for use as well as ornament, large numbers of trees have to be planted annually to maintain the woods. Indeed, every year the Duke plants from 600,000 to 1,000,000 trees. During this season a plantation covering 2,000 acres has been completed. It may be remembered that the Duke of Athole's plantations were thinned of 80,000 trees by the gale which destroyed the Tay Bridge. When the Planter Duke began operations on a large scale in 1774, the Dunkeld hills were almost bare. During his life the Duke, who may be described as a true benefactor to his country, planted 27,000,000 trees, covering an area of 15,000 acres.

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
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*Editor of Southern Planter, Richmond, Va.,
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Very respectfully,

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2, Rue du Landy, St. Denis, France.

[We have sent copies of the *Planter* as requested, and, modestly, we may say that our European circulation is increasing,]

DR. PAGE'S ESSAY.—We present to our readers this month an interesting essay by Dr. Page, Professor of Agriculture in the University of our State. It is too long for any one number of the *Planter*, and ought not to be cut up into parts. We, therefore, present it entire, and thereby add many pages to the regular issue of the *Planter* for this month, as a compliment to its readers. Dr. Page's communication should be well read and considered.

A LADY FARMER.

We hope we do not betray confidence when we quote from a personal letter received from a daughter of an old neighbor and valued personal friend who has lately died and made her his executrix and devisee of his homestead. As she is unmarried, and attractive in person and mind, and withal highly cultivated, we venture the advice, in view of the troubles mentioned in our extract, that she will not reject proposals from some gentleman, equally cultivated with herself, and let him manage the farm and she the dairy and other departments of the household. She says: "To speak of myself, my father's death has revolutionized my life. It was at the critical period of crop-saving, and no man of any value as a manager could be gotten to take charge of things at such a time; so I, with no assistant, have tried to step into the place he filled so easily and so well. It would be impossible for you to realize how ignorant I am of the commonest details, or the general principles of farming. Drawn suddenly from a literary life, and one of great physical ease and inertness, I rise at day and scarcely have time to eat—go from place to place on the farm, walking or riding the whole day, and making pitiful efforts to arrange and carry on the affairs that worked so successfully in the hands now so passive and powerless. Were you in my place, would you attempt to raise tobacco next year? Can you suggest a plan by which I might make as much from other crops?" Under the circumstances, these are enquiries which appeal to every reader of the *Planter*, and we shall endeavor to do our part in guiding the hands of the enquirer. Having, in her childhood, dangled her on our knees, we esteem her and the memory of her father too highly to fail in our encouragement of her efforts in the great cause of agriculture.

FRESH COMPLEXIONS.—If you have humors and pimples, boils and eruptions, it is because the system needs toning and purifying. Nothing will give you such good health, smooth and fresh skin and vigorous feeling as Simmons Liver Regulator.

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2. We find a number on our books whose contracts, made by our predecessor, we will execute to the letter; and possibly some few contracts unwittingly made by ourselves, which we will also fulfil.

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4. They demand the *lowest rates*, without regard to the privileges they seek to secure.

5. Our purpose in the future is to take their advertisements on the terms of those advertisers who deal with us directly.

6. No independent journal can comply with, or justly meet, their demands.

7. Our exchanges show that many accept their exactions, but we cannot.

SHEEP HUSBANDRY IN TIDEWATER VIRGINIA.—We have a letter from a gentleman of West Virginia asking for information on this subject. We are sure that sheep-raising may be, and probably is, made a good industry in our Tidewater counties. We would be glad for some reader of the *Planter* to furnish some practical experience on the question of the adaptation of this section to sheep husbandry.

At the date of this writing, we find that entries of *slaughtered mutton* have been made for the State Fair, and the prospect is that the best will come from the Tidewater section.

EGYPTIAN CLOVER.—It is said that this is a *legacy of the war* to Georgia and other Southern States; that it grows in the track of the armies; that it is hardy, killing out weeds, etc.; and that it is highly esteemed by stock of all kinds, and makes a fine pasturage where nothing else will grow.

Is this the *Lespedeza* which is also appearing in many places in Virginia? It seems to come without seeding, and a friend left with us a few days ago a fine specimen, gathered in Nottoway county, of our State.

WINTER OATS —“A ‘young farmer’ from Warrenton, Va., states, in *Southern Planter*, that Russian White oats, without fertilizer, made four times as much per acre as ordinary oats with fertilizer.”—*Ex.*

We think our young farmer can verify his statement. *Spring* oats are very uncertain, even on good land, so that a good variety of *winter* oats has a decided advantage. We hope the young farmer will let us hear from him further on the subject, and give us his name, as, by the general rule of all publishers, anonymous articles are rejected. A correspondent may sign his communication *anonymously*, but the name of the author should be known to the editor.

We were called on to-day to give the name and address of “young farmer” by a gentleman who wished to correspond with him, but we were unable to do it.

THE SUMMER NUMBER OF THE LONDON, ENGLAND, “GRAPHIC.”—We have received from the publishers, 190 Strand, London, their issue of the “Summer Number of the *Graphic*,” which, to be appreciated, must be seen. It is a wonderful specimen of what may be done in *printing in colors*. It is beautifully printed in colors, and no expense, it seems, has been spared in its production, and cannot fail to please all who may patronize it. We see one of our enterprising Richmond manufacturers appreciates its value as an advertising medium.

THE “LADIES’ FLORAL CABINET.”—We will club with it at \$1.90—that is, will send it with the *Planter* to any *new subscriber* at this price.

The October number of the *Cabinet*, published in New York, is on our table, and presents choice reading for lovers of flowers. Several illustrations brighten its pages. Its editorials on *soils* and *annuals* are interesting and useful to all who are interested in the culture of flowers. And can there be any home in the lovely South where not one of its inmates are not thus inclined? Take the *Planter* for the farm and the *Cabinet* for the yard and pleasure grounds of the family.

THE INDUSTRIAL EXHIBITION OF THE AGRICULTURAL SOCIETY OF SOUTH CAROLINA.—As we go to press with our last number for the year, we have time only to make a brief acknowledgment of the receipt of the catalogue for this exhibition, which commenced in the city of Charleston on 21st November, and ends on the 16th of December of the current year. The catalogue is handsomely engraved and printed, and embraces all the industrial interests of the South except live stock. It is well worthy of the attention of manufacturers of all classes. The display of textile machinery and fabrics we have no doubt will be very superior. Phosphates and fertilizers will also be an interesting feature.

AMERICAN AGRICULTURAL ASSOCIATION. The American Agricultural Association will hold its Third Annual Convention at the Grand Pacific Hotel, Chicago, commencing Wednesday, December 15, 1882, and continuing three days.

Addresses will be delivered, and papers read by the ablest and best known Agriculturists, Scientists, and public men of the country. Questions will be discussed relating to Agriculture and kindred topics.

Reduced rates of fare are expected from the different lines leading into Chicago, and it is designed that this shall be a worthy successor to the Conventions already held by the Association, the first at the Metropolitan Hotel, N. Y., in 1879, and the second at the Grand Central, N. Y., February, 1882.

Every farmer, and all interested in Agriculture are cordially invited to attend.

Membership in the Association \$3 00 per year, including the registration fee, and entitling each to free admission to the Association's proposed Exhibition, to be held next year, and to all its publications, including the *Agricultural Review*.

Payments made now will be good for next year.

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N. T. SPRAGUE, President.

JOS. H. REALL, Secretary.

THE NIAGARA GRAPE.—This new variety of *white grape* has been introduced and carefully perfected by the *Niagara Grape Company*, of Lockport, New York. We have noticed in some of our exchanges—notably the *Rural New Yorker*—many commendations of it. We have received from the Secretary of the company, Mr. J. S. Woodward, a basket containing a few bunches of this grape, which he states were cut from the vine on the 3d November ultimo, and had been matured in September. These bunches came to us in perfect order by express, and were received on the 6th of November. They are, undoubtedly, delicious in taste and flavor, and in color quite as light as the famous foreign *Malaga*. We have submitted them to several connoisseurs, and they pronounce them excellent.

Virginia is a great *grape State* in its adaptability of soil and climate, which our colonial ancestors wrote about two hundred years ago, and our people should find out and cultivate the best varieties. As to this particular variety, we are not now prepared to say more than we have said.

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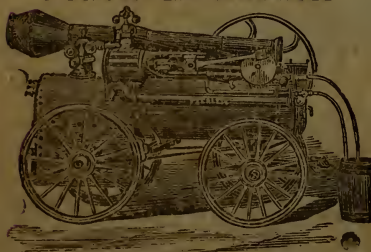
This is a **Steel-Disk pulverizing Harrow**. Is used after a fallow for cutting sod-land to pieces for deep harrowing, for **pulverizing** and **leveling** to pieces to a depth which **no other harrow** can reach; for getting in grain, &c. The driver, on his seat, can change the position of the disk at will, making it heavy draft, **cutting deep and pulverizing** thoroughly, or to a position which will simply cut the heavy sod to pieces. In which position it is the **lightest draft harrow** made. This harrow is particularly recommended for **deep and heavy harrowing**.

We can fully recommend the **BICKFORD & HUFFMAN DRILL**. In offering it to our customers, we can guarantee satisfaction in every particular, for drilling Wheat, Oats, Corn and Peas with all kinds of Grass Seed and Fertilizers. It has a non-corrosive bottom. The quantity per acre of seed and fertilizer is accurately and easily regulated. One motion takes hoes up and throws every working part out of gear.

WHEAT DRILL.



PORTABLE ENGINE.



Our **SMALL PORTABLE ENGINES** are well adapted for cutting **Ensilage** and other feed, **shelling** corn, **driving** small grinding mills, **sawing** wood, &c. These Engines are particularly recommended for their **SIMPLICITY, DURABILITY, SAFENESS, PERFECTNESS** and the little skill required to manage them.

We also have **LARGE ENGINES**, Portable and stationary.

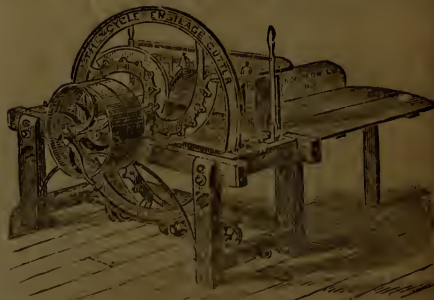
The **CYCLE** and the **BELLE CITY** are the most perfect. They **never clog or choke** and require very little power; they will cut up any kind of feed. We keep the **SINCLAIR** and many other good cutters. We call attention also to our **superior**

WHEAT DRILLS, SORGHUM MILLS,

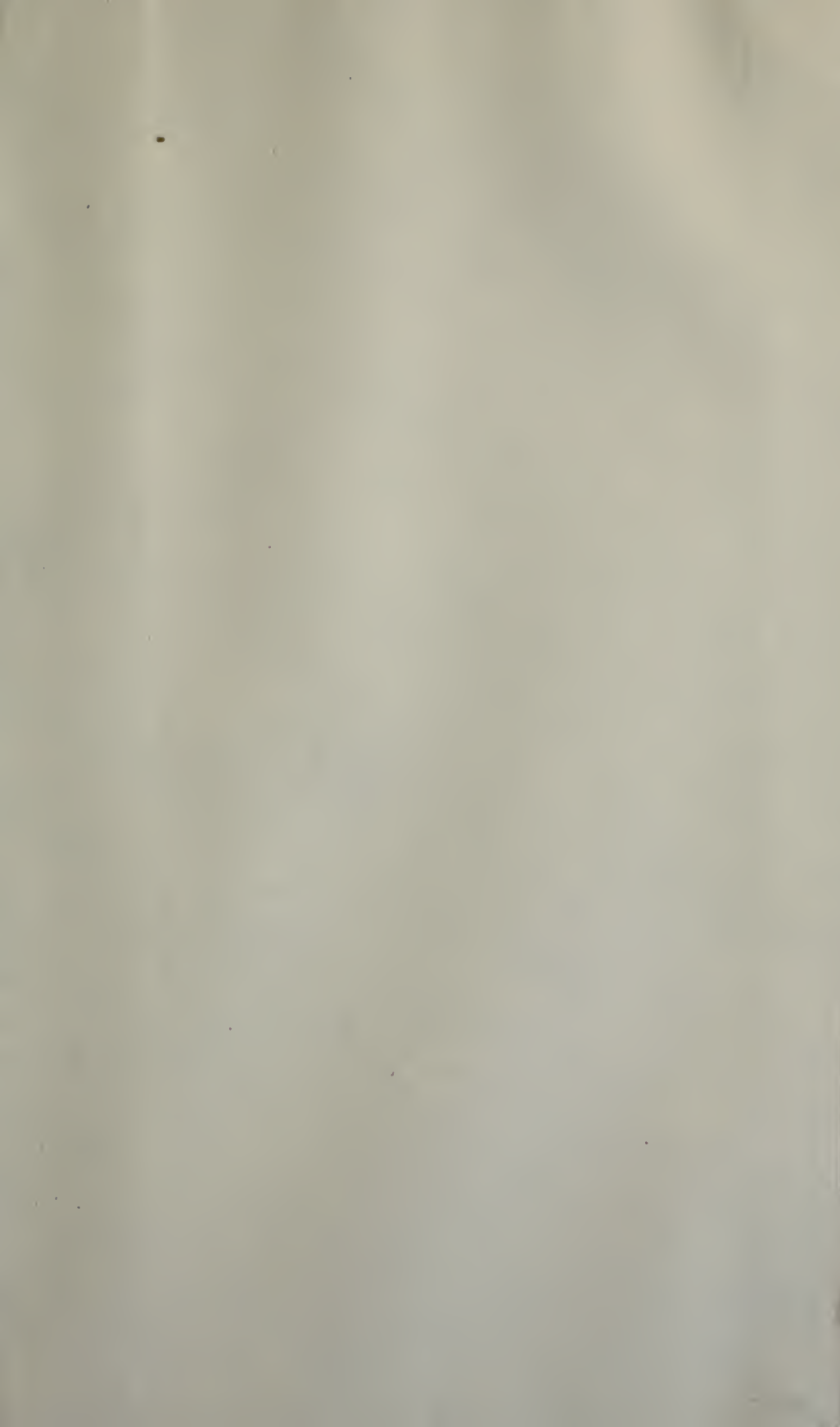
Evaporators, Corn Shellers, &c.

SEND FOR CIRCULAR AND CATALOGUE.

Ensilage Cutters.



H. M. SMITH & CO., MANUFACTURERS & GEN'L AGTS.,
P. O. BOX 8, RICHMOND, VA.



NON-CIRCULATING



